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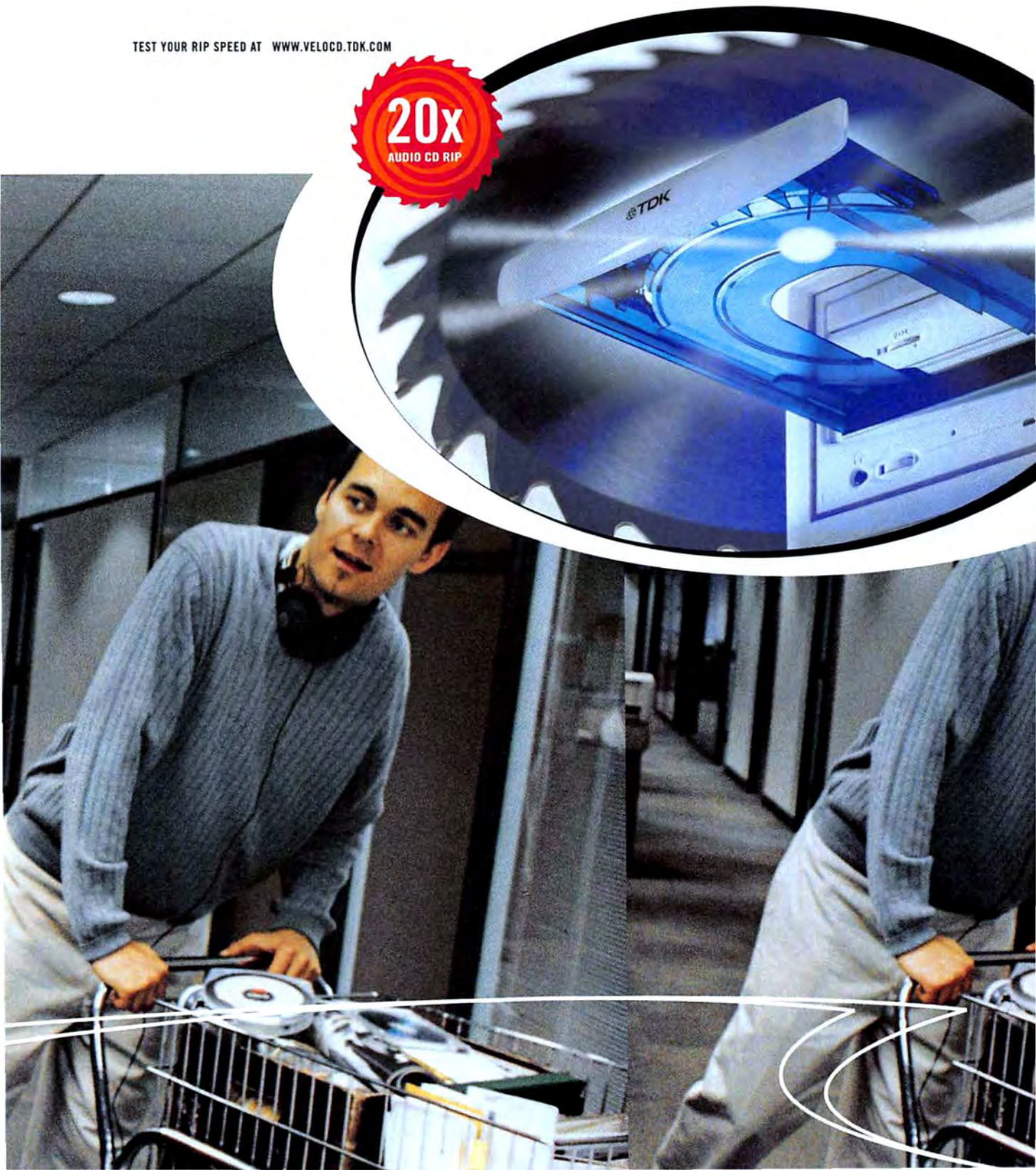

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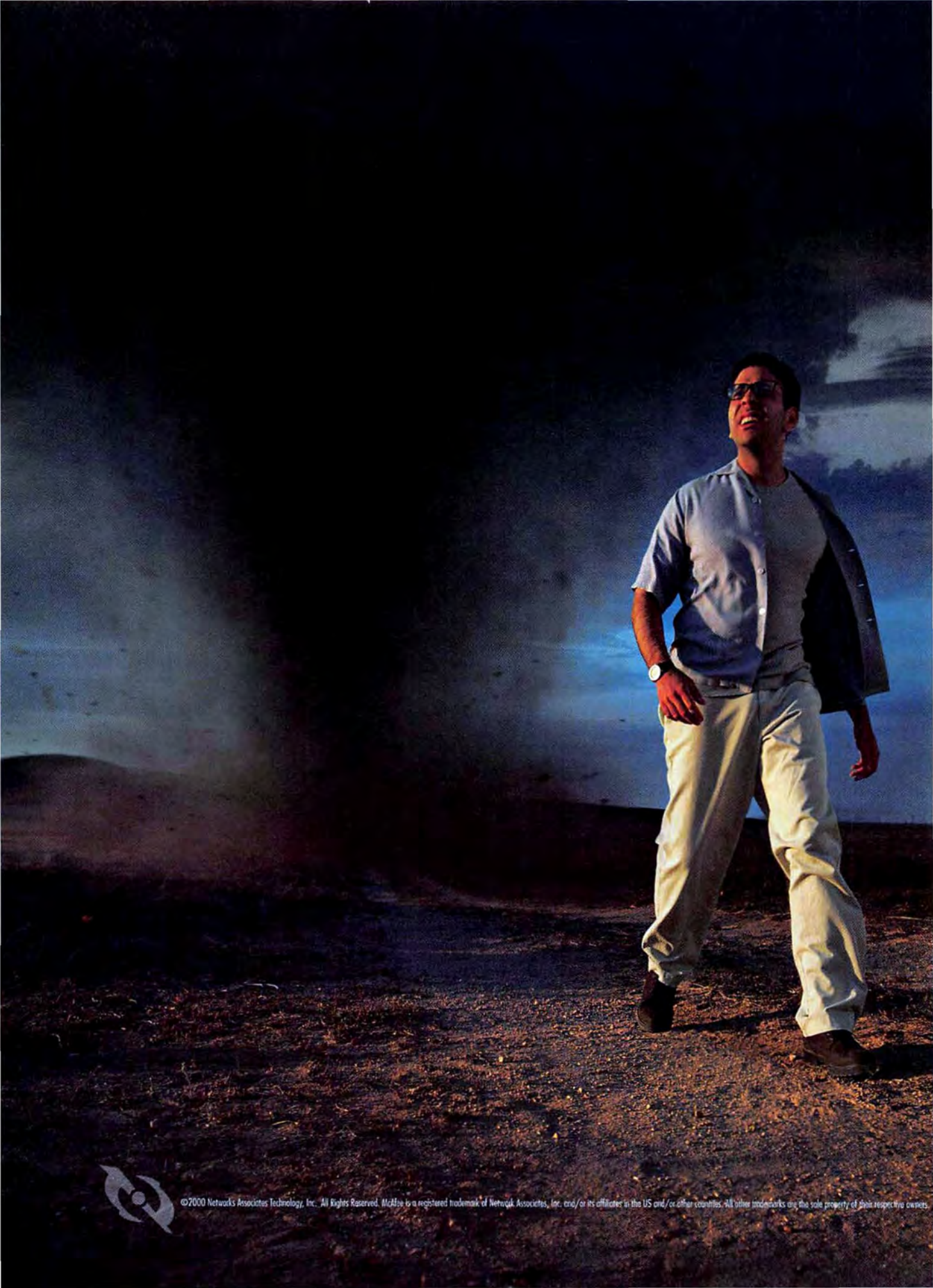

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100

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100 THE BEST OF THE WEB

online In *PC World*'s Midsummer Madness Tournament of Champions, 64 hungry Web sites in 32 categories battle for the trophy. Our editors narrow the field down to the final four, then to just one. Find out the top places to go online for computer gear, online storage, search and Web tools, financial services, and more. What's the last site standing? The result may surprise you.

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online Additional material available online at www.pcworld.com

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CONSUMER ISSUES "9:53 a.m. Entered the store holding a suspicious-looking beige box. Set it on the counter and coolly asked for help. The techie cracked the case, blinked, and called in the coroner." When your PC and your money are at stake, you need a fix that sticks. We surveiled the state of professional PC repair from deep cover and found that the knowledge—as well as a mass of ineptitude—is out there.

135 FANTASTIC FLATBEDS

REVIEW Prices have held steady over the past year, but the money buys a lot more scanner than it did 12 months ago. We survey the flatbed landscape for prominent silhouettes and identify SOHO and corporate winners on ease of use, features, scan quality, scan speed, and service and support.

145 HIGH-SPEED SURVIVAL GUIDE

HOW-TO Fast Internet connections online have allure—be they digital subscriber lines or cable modems. But the circuit board jungle throbs with horror stories of botched installations and service personnel MIA. Don't sweat. Our fearless Net scout will lead you safely through the heart of DSL darkness and past cable quagmires. Find more online (www.pcworld.com/augoo/dsl).

161 A PIXEL'S WORTH A THOUSAND WORDS

REVIEW You want professional-looking photos to display on your online Web site or to print and pass around. You don't want a visual accompaniment to Willie Nelson singing "Red Eyes Glaring in the Frame." But which photo editing package works best for you? We look at 12 contenders priced from $40 to $109 and capture some picture-perfect bargains. ▶

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SMART SHOPPING For the best concert or game ticket deals online, check out our site picks and insider tips.
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SHOOTOUT: POCKET PC DEVICES

REVIEW We test three handhelds: HP's Jornada 540 series, Compaq's IPaq H3600, and Casio's Cassiopeia E-115.
www.pcworld.com/aug00/pocket_pc

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HOW-TO Using notebooks continually is dangerous. We look at the hazards and show you how to work safely.
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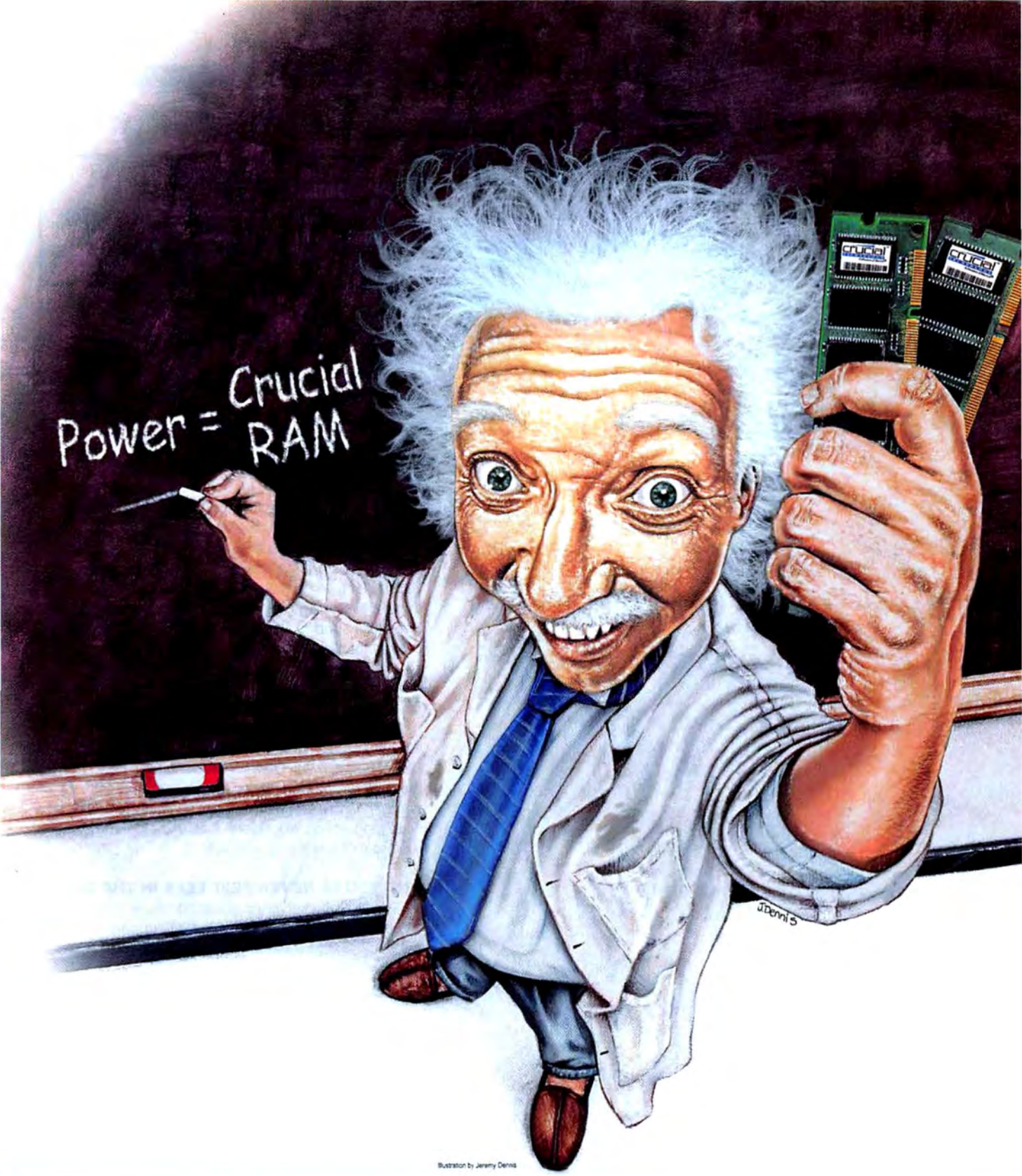

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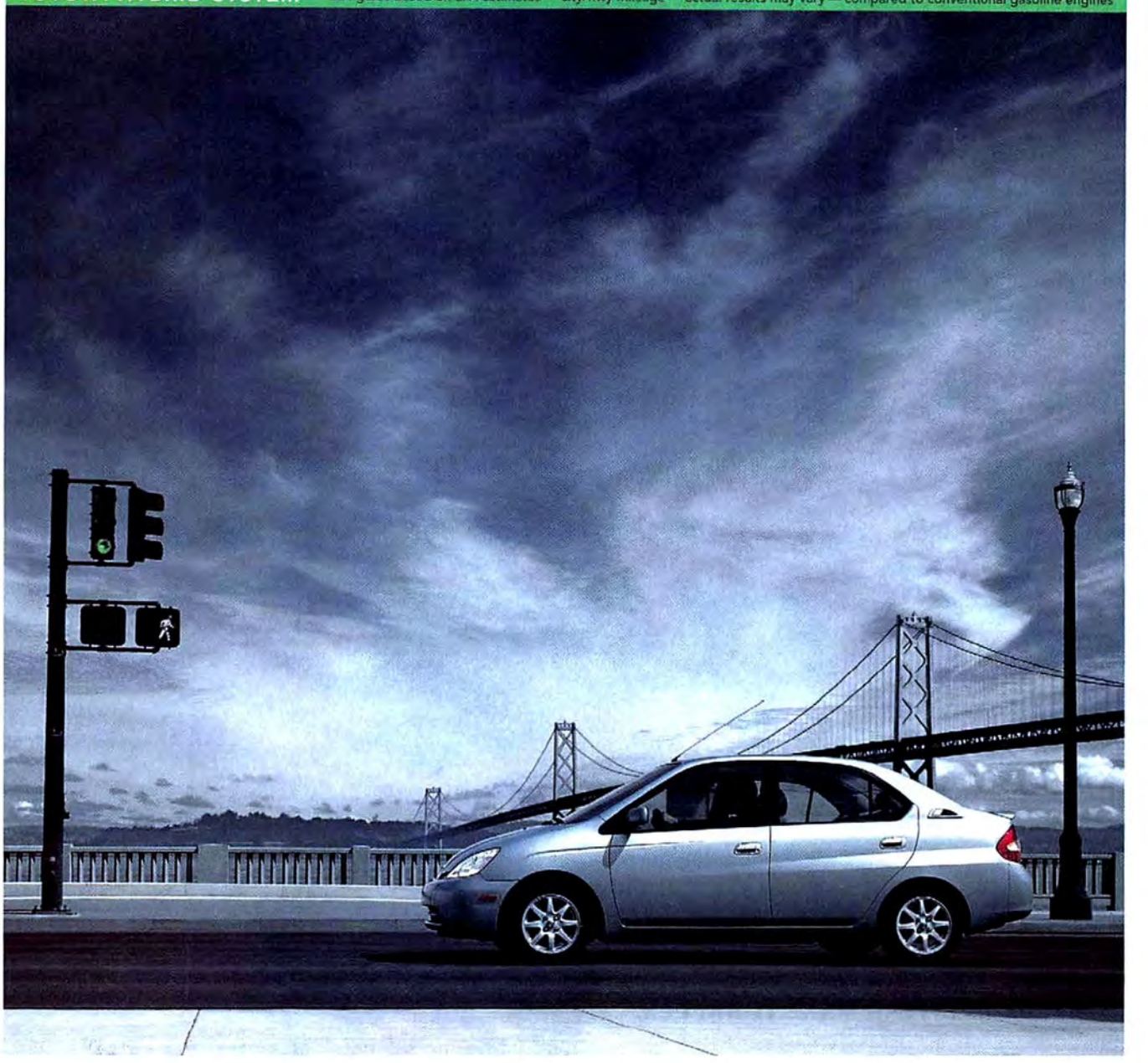

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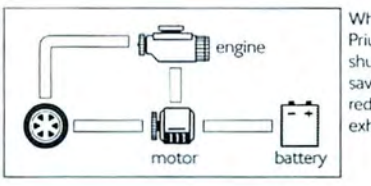

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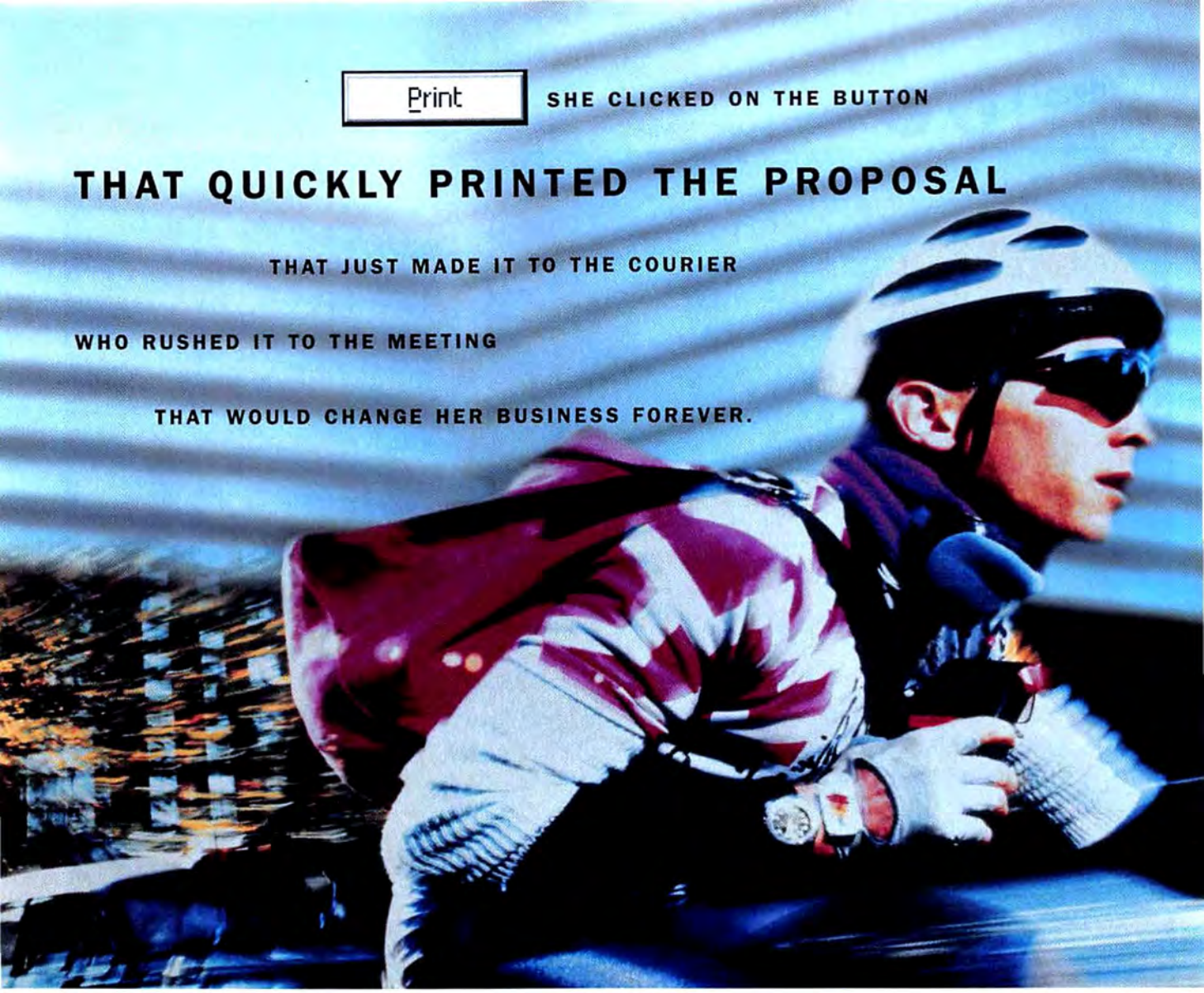

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Revolution or Evolution?

THESE ARE REVOLUTIONARY times in the computer business. It's not just that a federal judge wants to break up mighty Microsoft. The very concept of a PC is changing radically.

At the high end, affordable desktop boxes have cracked the 1-GHz barrier in processor speed (see our head-to-head review of two of the latest models on page 44). At the low end, the *slowest* machine on our *Top 10 Budget PCs* list (see page 192) still purrs along at a respectable 500 MHz—and costs just $829. Sleek new "legacy-free" PCs, like Compaq's IPaq and HP's E-Vectra, drop some of the cumbersome hardware and ports of older PCs. And minimalist "Internet appliances" focus solely on Web browsing and e-mail.

"The PC is dead," some pundits say. We don't agree. Here's why, and here's how PC World plans to respond.

Speaking of the Web, look at how it has transformed office and daily life. Businesspeople use the Web for everything from communicating to scouting prospects to researching purchases (at www.pcworld.com, among other places). And many of us take the Net home, using it to stay in touch when we're out of the office.

Beyond that are a range of near-PCs—like the ubiquitous palmtops, personal communicators, and two-way digital pagers. With the arrival of Web-ready phones this year, a growing number of us are connecting wirelessly to offices and the Web, bypassing PCs altogether.

No wonder some pundits have declared the traditional PC dead—or at least circling the drain.

All of which raises the question for *PC World*—and its readers—of what the magazine ought to cover these days. We don't face this question alone, of course. Already two publications that focused mainly on PCs have fled to trendier pastures. *PC Computing* recently renamed itself *Smart Business*, and *PC Week* became *eWeek*. So what's next for *PC World*—*eWorld*?

SHOULD PC WORLD BECOME E-WORLD?

WE DON'T THINK SO, and here's why. All the evidence suggests that *PC World* continues to fulfill its historic mission: helping you plan for, buy, integrate, and use the technology that enables companies and individuals to boost productivity. During the past five years, under the able direction of Phil Lemmons and Cathy Baskin, *PC World* earned 57 awards for editorial excellence from its business, technology, and general press peers. More important, audience research and anecdotal comments from readers suggest the magazine is still reaching smart, knowledgeable, influential readers—and more of them than ever.

This month I have the honor of joining *PC World*'s 85 outstanding editors, writers, and engineers, so it's a good time to share with you some of the magazine's plans.

To begin with, *PC World* won't abandon the coverage you've come to expect. For evidence, read the latest installment of our PC repair investigation (page 118); several big national chains did poorly in our undercover test of computer repair shops. We will continue to cover basic hardware and software; see this month's features on color flatbed scanners (page 135) and low-cost image-editing software (page 161). And next month's PC upgrade special (see the full listing below) promises to be the best ever.

At the same time, the magazine will undergo evolutionary—not revolutionary—changes. It will pay more attention to the business uses of technology, since roughly three out of four subscribers are managers. And it will continue the recent trend of covering a slightly wider range of equipment and services. Our readers are using more technology these days—things like the aforementioned palmtops, wireless devices, high-speed access, and home networks—and we aim to go there with you (check out "High-Speed Survival Guide" on page 145).

That's what we believe you would like to see from *PC World*. If you have comments or ideas that you would like the magazine to consider, please write to me personally by e-mail at eddir@pcworld.com or send a letter to *PC World* at 501 Second Street, San Francisco, California 94107.

COMING UP IN SEPTEMBER

Ultimate Upgrades: Turn that garden-variety PC into a digital darkroom, screaming game machine, or multimedia studio.
Search Party: Looking for links in all the wrong places? We show you which search engines are likely to find what you're after.
Locked Out of the Web: People with disabilities have very limited Web access. We look at what works and suggest future directions.
Notebooks for Travelers: Tired of massaging that dent in your shoulder? Check out our review of tiny but talented laptops.
I Hear You Hacking, but You Can't Come In: Foil break-ins, hobble Trojan horses, and repel hack attacks with security software.

Kevin McKean is editorial director of PC World. ■

PHOTOGRAPH: ERIK BUTLER

A revolution is taking place and you get to be the leader. Power and ultraportability have joined forces in the new Toshiba Portégé® 3480CT portable, with the mighty Mobile Pentium® III processor 600MHz featuring Intel® SpeedStep™ technology. Under the sleek design you'll find the performance of larger notebooks, at half the weight. Multimedia screams from a bigger, brighter screen. It's technology that sets you free. So work on your own terms. Your kingdom awaits.

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YOUR TAKE ON: Cookies and other privacy threats ◆ PC shopping ◆ Hard drives

MORE LIGHT ON NET PRIVACY...

"PRIVACY 2000: In Web We Trust?" [June] is the best article on privacy I have read in a long while. It is must reading.

If you use the Web infrequently, as I do, you can almost spot when and where your data was sold or stolen. I can go for weeks with no trips to a Web site and no spam in my mailbox. Then, after visiting one site and doing no more than looking for a piece of information, the next morning I will find eight or ten spams.

Hazel M. White
Independence, Missouri

IN YOUR PRIVACY articles, a company named A.S.A.P. Investigations and others like it are said to broker personal information about the public without legal penalty. I found this incredible! How can this be allowed by the government, I wondered. However, I found an interesting update at the A.S.A.P. Web site (www.asapinvestigations.com), which says:

"Due to the signing of Senate bill S900 on 11/12/99—we will no longer be providing Account Numbers or Balances of researched subjects. We will provide a list of banks the subject deals with."

Perhaps we are making some progress in recovering privacy, after all.

Matthew Butler, Tampa, Florida

...THE COOKIE MONSTER...

REGARDING YOUR discussion of cookies in the June "Net Privacy" issue: The danger of cookies has been way overblown because people have been misinformed. Usually, cookies are unable to profile users because each domain controls its own cookies.txt file (although DoubleClick did attempt to get around this). But ordinarily, Web sites cannot access people's Web surfing habits.

David Chen
Saratoga, California

...AND OTHER TRACKING TRICKS

ALTHOUGH EVERYONE is concerned about the impact of cookies, very little is being written about two other, more insidious mechanisms used by Web sites to track surfers—neither of which can normally be turned off.

1. The referer header: This is a header that is sent by your browser when you surf to a new site. It contains the URL of the site from where you came. The new site can use this to tell how you got to its site. This cannot be disabled in most browsers.

2. Use of CGI [Common Gateway Interface] scripts to track surfers: Instead of a link such as www.vbnm.com/page.html, a Web site may have a link that looks like this: /cgi-bin/transfer?target=www.vbnm.com/page.html. Such links permit the ▶

HOT BUTTON

PC Shopping: Salesman Defends Stores; a Consumer's Caveat

YOUR ARTICLE "The Buying Game: Best and Worst Places to Shop for a PC" [June] was a hatchet job. To denigrate computer reseller chains because of experiences at a few stores, or with two or three salespeople, was stupid, journalistically unethical, and fraudulent. You didn't explain the stores' point of view, so you left readers with the impression that major retail outlets are hotbeds of incompetence and high-pressure tactics.

We salespeople provide many valuable services to our customers. We explain things, hold their hands, negate their fears, and wisely guide them through the buying process. To better assist my customers, I spend an hour or two every night studying products and IT news on the Net. I'm certified by vendors such as HP, Epson, and Microsoft.

If the chains disappear, what will you do when the desire strikes to physically handle and explore products? Customers want to judge for themselves. They need our stores.

You also were grossly unfair to the store that aroused your ire because it deploys industry-standard laptop locks. That store had every right to protect its inventory from thieves. Our battle with shoplifters is an ongoing and intense effort.

Resellers provide a very valuable service by promoting comprehensive coverage programs. Technology breaks—something you've verified yourself.

You tell about a customer who couldn't return his malfunctioning new PC because the 14-day return/exchange period had expired. The major chains advise customers of this return policy. Once they're outside that period, they shouldn't expect the store to solve their problems—that's what PC manufacturer warranties are for.

These 14-day return policies ended a game in which thousands of people around the country would buy new equipment, play with it for almost a month, and then return it for a full exchange. The returned gear had to be discounted and sold off clearance tables.

Joseph Anderson, Jr.
Computer salesman, major chain
Harlem, Georgia

I PURCHASE three or four PCs a year for work or home. You suggest that the Web can be the best venue for the computer-savvy. My own online purchases have been rewarding, but I am aware of many of the tricks to watch for, such as similar model numbers, hidden shipping and handling charges, and the fact that "refurbished" doesn't mean "fixed." Bottom line: Pay attention to the details, and don't expect to get what you don't specifically see or read in the site's product description. Caveat emptor.

Dan Conine, Sheboygan, Wisconsin

ILLUSTRATION: JAMES YANG

BREAKTHROUGH STUDY REVEALS

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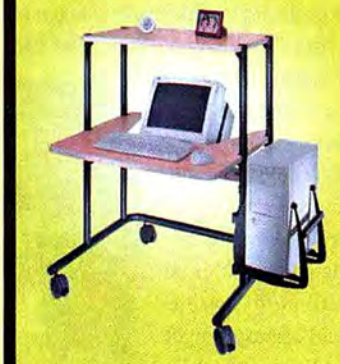

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David Jameson, Chappaqua, New York

DENSE HARD DRIVES

IN YOUR JUNE Tech Trend piece "How Big Can Hard Drives Get?" [*Top 10 Power PCs*], Steve Wilkins, marketing manager for drive maker Quantum, jests that when hard drive storage density reaches its limit, causing drives to become worthless random-number generators, engineers can raise the limit again by bending the laws of physics.

I would willingly give up some gigabits of storage, or have another platter added, if I could have a solid and reliable drive designed well below the density limit using "plain-ol'-unbent" laws of physics.

Charles Barker, Huntsville, Alabama

SOLD!

ARTICLES like June's "Hammer Time!" (about online auctions for small business) keep me coming back to *PC World*. They help me *use* the Internet. *PC World* is a veritable one-stop superstore of useful computer knowledge!

Nathan Dunn, Flint, Michigan

PC World *welcomes your letters to the editor. Send e-mail to letters@pcworld.com.* ■

CORRECTIONS AND CLARIFICATIONS

JULY'S "Best Products of 2000" should have noted that Interact Commerce Corporation now owns the Act 2000 personal information manager. Also, the correct URL for Corel Linux is linux.corel.com.

In June's "Stealth Surfing," we should have said that Symantec's Norton Internet Security 2000 costs $54 as a download. In addition, the correct URL for Gibson Research's ShieldsUp site is www.grc.com.

In June's *Top 10 Printers*, we listed the HP DeskJet 832C as a Best Buy. However, while the DeskJet 832C may still be available, it is no longer in production.

PC World regrets the errors.

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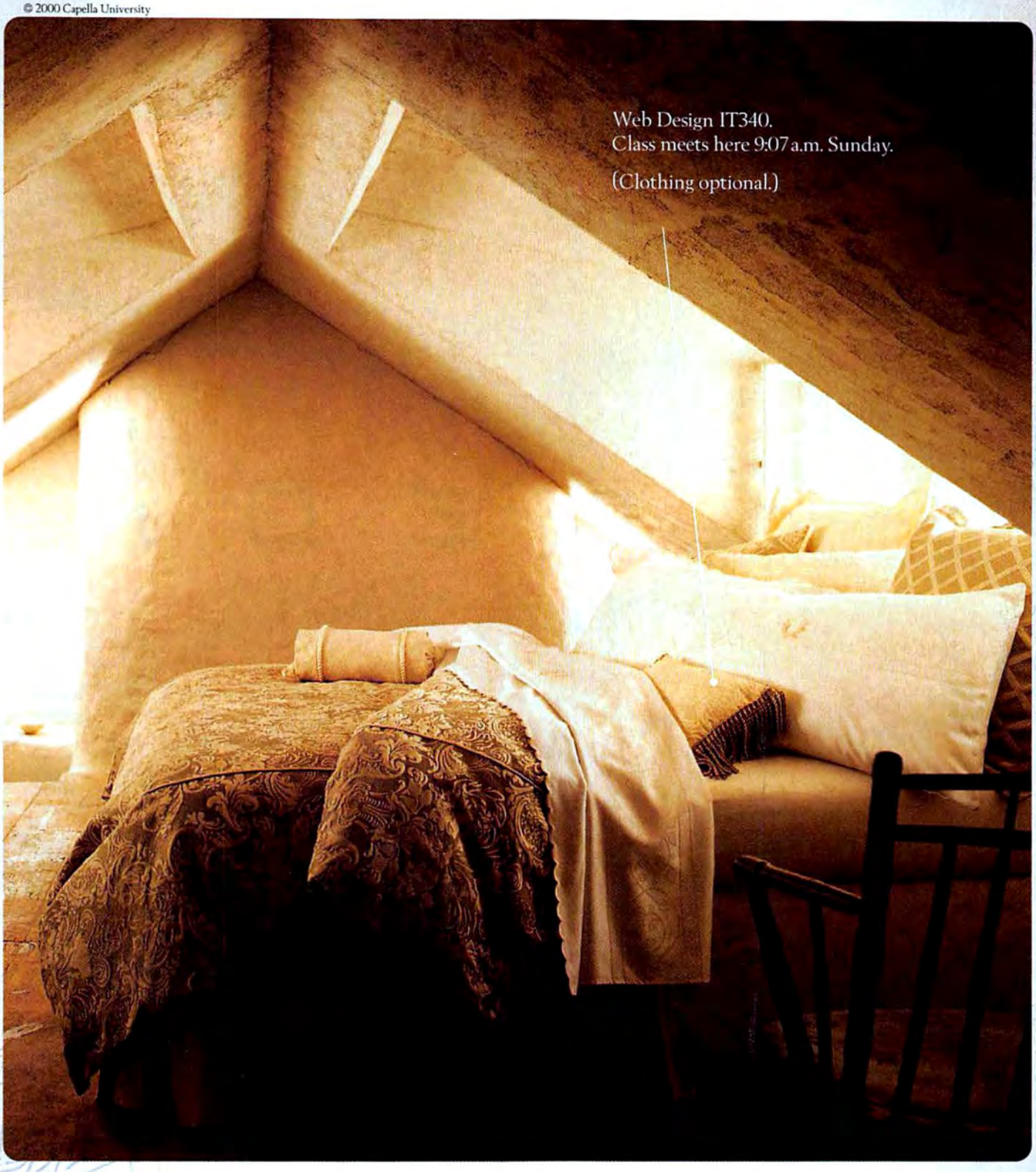

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The Truth About Extended Warranties

The spiel sounds good. But just what do you get for your money?

YOU KNOW THE DRILL. You're ready to plunk down some money on a state-of-the-art PC. You've run through a gauntlet of decisions, and just when you think you're done, here comes one more: "Do you want to buy an extended warranty to protect that purchase?" Sure you want to protect your purchase. And the pitch is appealing. "No matter what goes wrong, we'll fix it." Should you bite?

In the past, I've always said no. Experts say that if anything goes wrong with a computer, it's likely to do so right away—long before an extended warranty kicks in. And many PCs come with a three-year warranty that offers protection for most of their useful life.

But my real reason is skeptic's disbelief: Anything that sounds so comforting at the scary moment when I'm about to spend $2500 can't be a good idea. And some hungry salespeople oversell extended warranties and gloss over less expensive alternatives. A salesperson for a major national chain told me that his store's management "wants us to push the extended warranties. They tell us that's where they make most of their money. A lot of times your performance selling them reflects how many hours you get [to work]. So there is a lot of pressure."

At press time, the Florida attorney general's office was investigating the sales tactics Best Buy salespeople have used to sell warranties. The state is checking into allegations that salespeople misrepresented the manufacturers' warranties in order to sell the extended ones.

NOT SUCH A BAD IDEA?

SO I'VE BEEN A habitual naysayer when it comes to extended warranties. But after talking to a host of experts, I'm changing my mind, at least slightly. Even *Consumer Reports*, which once advised its readers to "resist the offer of an extended warranty, which usually amounts to expensive and unnecessary insurance," has softened its stance. "We've refined our point of view over the years," says David Heim, the magazine's managing editor. "For certain kinds of products it makes sense: if it's expensive to buy, might be trouble-prone, and could be expensive to fix. In other words, a laptop."

Should you purchase an extended warranty for your new PC? That depends on the machine you buy, the quality of its standard warranty, and the potential cost of nonwarrantied repairs. Also consider how much you're willing to spend to escape paying for a repair nightmare that *might* happen—but probably won't.

Start by doing the math. A typical extended warranty sets you back 10 to 15 percent of the cost of the product per year of additional protection, but prices vary from retailer to retailer. Can't decide whether the premium is worth it? Try to get an idea of what you might have to pay for a repair if you choose not to buy the warranty. One source of useful information is our "The Price You Pay" chart accompanying this issue's "PC Repair Undercover" feature (see page 128), which details costs for the most common PC repair jobs. Keep in mind that many shops charge at least $50 to look at a computer and determine what's wrong with it. ▶

ILLUSTRATION: LOU BEACH

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The upshot: The cost of an extended warranty will probably exceed what you'd otherwise pay for a minor repair such as replacing a faulty video card. But if your system suffers a rare catastrophic malfunction such as a motherboard failure—or goes into the shop repeatedly for various problems—you may be glad that you extended its warranty.

PUT IT ON YOUR CARD

ONE FACT NO salesperson will tell you is that the retail store's pricey warranty isn't your only option. If you have a premium credit card such as a Visa Gold or American Express Optima, you may already have the wherewithal for an extended warranty at no additional cost, right in your wallet. Simply by paying for your PC with that card, you could gain an extra year of warranty protection. (Check your card's member agreement for details.)

If that's too little protection for your needs, you can probably buy more coverage from your card's provider. This type of warranty may offer such extra features as phone support that you can call on if you can't get through to your manufacturer's help line. So before you pay a PC vendor for an extended warranty, make sure you know what your credit card offers—both for free and for a fee.

GET YOUR WARRANTY ONLINE

SHOP FOR A PC online these days, and you're likely to face the same question you'd get in a store: "Do you want an extended warranty with that?" But at least on the Web you don't have a commission-hungry salesperson trying to strong-arm you into buying it then and there. Instead, you can read a plan's fine print at your leisure before making a decision.

Third-party warranty sites such as WarrantyNow.com even let you buy an extended warranty for a PC you already own. Or you can go to Warrantynet.com, tell it what kind of computer you have or are buying, and get bids from multiple warranty vendors. (Pay attention to what each warranty covers—and especially what it doesn't—rather than just to the price.)

Even if you plan to buy retail, go online before you go shopping. First, check ▶

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the Web sites of retailers on your shopping list for warranty plan details; then get quotes from third-party warranty providers. That way, you'll know in advance what a store's warranties cost, what they cover, and what your other options are.

NO PEACE OF MIND

ONE LAST CONSIDERATION: Though extended warranties sometimes make sense, they merely protect against the cost of repairs. No plan can guarantee that your PC won't flake out at the worst possible moment or that getting it fixed won't devour your precious time (and data).

Consider the story of Robert Barcik of San Francisco. When he bought a Compaq laptop at Circuit City, he elected to pay $300 for an extended warranty plan offered through GE Warranty. The salesperson's spiel sounded compelling: If anything went wrong, the computer would be fixed. If it needed to be repaired more than three times, he'd get a new one. Says Barcik, "I bought [the warranty] because I didn't want to worry about finding a service place—I just didn't want to worry."

As it turned out, his laptop did break down—repeatedly. Barcik had to bring the computer to Circuit City, wait for it to be repaired, then bring it in again. And again. After Barcik's third trip to the repair center he learned a crucial fact: The laptop would be replaced only if it broke down three times *for the same problem*.

Eventually, Compaq stepped in and fixed the notebook to Barcik's satisfaction for free, even though its original warranty had expired. But by then, he says, "I would have preferred to take a sledgehammer to the thing." The extended warranty couldn't save him from months of trouble and wasted time. It could only protect him from having to pay for the repairs. And that's all any of them do.

Now, if the day ever comes when an extended warranty possesses the power to stop your computer from eating a week's work or from seizing up as you try to purchase 1000 shares of Cisco, that's the day when I'll wholeheartedly say: Buy it!

Christina Wood is a PC World *contributing editor.* ■

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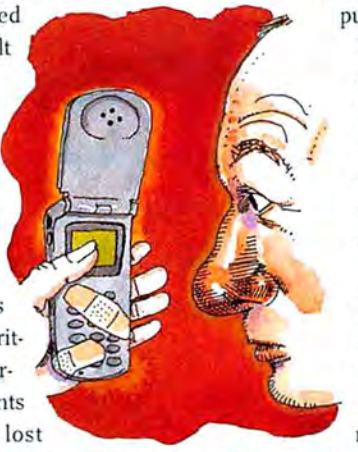
When 'Replacement' Means 'Refurbished'

WHEN ROBERTO DOUMET of Miami saw Sprint PCS's TV ad featuring a black-robed prophet promising wireless Web access, he was hooked. He canceled his regular cell phone service and bought a Web-enabled Motorola phone and an insurance plan to go with it.

Three days later his phone was stolen. As a replacement, Sprint offered him a refurbished phone. "But I paid for a new phone, not a refurbished one," says Doumet. "I felt like I was robbed twice."



Unfortunately, he isn't the only one who's had this experience. Customers of companies such as Dell, Hewlett-Packard, and Sony and of several online retailers and auction sites have written me about getting refurbished PCs or components to replace damaged or lost ones. In most cases, a customer returns an item—often under warranty and within weeks of the original purchase—for repair or replacement and ends up receiving a refurbished product.

Is this practice legal? It sure is—as long as the vendor outlines its warranty and insurance policies in the product documentation. But this information is sometimes hard to find, especially with online purchases. So before you buy, get all the facts straight, especially the fine print on the warranty. (For details on extended warranties, see this month's *Consumer Watch*, page 27.)

Many vendors reserve the right to replace faulty parts with reconditioned ones, especially for pricey components such as monitors.

As for Doumet, Sprint PCS's Florida public relations manager Nanci Schwartz says the insurance policy states that replacement products may be reconditioned, although Doumet says he never received any documentation for the policy. Sprint PCS is working with Doumet to resolve the dispute.

ILLUSTRATION: JOE CIARDIELLO; ICONS: JEFFREY PELO

Heads Up...

Seamy Site Scam: A ploy that could show up on mainstream Web sites has recently been reported on some adult sites: A person goes to a site or receives an e-mail promising free access to X-rated photos. To access the pictures, the user must first click a button on-screen. The screen explains in fine print that clicking the button will cause the user's modem to dial a toll number overseas—at a cost of $7 or more per minute. That critical information isn't made clear up front. Be wary. **PayPal Tests Its Friendship:** We've heard from several disgruntled customers of X.com's PayPal, a Web-based payment service. Reported problems range from inability to access accounts to unresponsive customer support. X.com's Director of Communications Vince Sollitto acknowledges the difficulties, citing a recent upsurge in number of users and a failure of the in-house credit card processor. Sollitto says the company has installed new hardware and added 200 customer service reps to keep the site running more smoothly. **MaxTech Goes Belly-Up:** This manufacturer of PCs, components, and peripherals in Cerritos, California, has gone out of business. For information about support for some MaxTech products that are under warranty, contact Assurance Service at 562/926-0747.

LETTER OF THE MONTH

WHEN I TRIED to order a boxed copy of WinFax Pro 10 from Buy.com, I pressed a button marked 'You must click this button to get your product'. When I saw something was about to be downloaded to my PC, I canceled out of the screen because I wanted the product shipped to me. Even though I didn't download the software, I was billed for a copy. I called Buy.com, but a rep refused to issue a refund, despite the site's promise of a 60-day refund policy for all software.

Mel Burstein
Santa Ana, California

***On Your Side* responds:** "Downloading software is another means of delivery," says Travis Fagan, vice president of customer support at Buy.com, "and just as your credit card is charged upon shipment of a product, it'll be charged upon download." To get a refund from Buy.com, buyers complete, sign, and return a "letter of destruction," a "good faith" contract promising they no longer have the downloaded software on their PC. Buy.com credited Burstein's card for the inadvertent purchase. He ended up buying a copy of the program from Symantec. ■

GOTTEN A RAW DEAL?

Or a great one? E-mail the details to onyourside@pcworld.com. We'll investigate complaints and publish items of the broadest interest. Anne Kandra is a contributing editor for PC World.

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Are the Best ISPs in Life Free?

I'VE HAD THE SAME Internet service provider for half a decade now. Each month, I pay its fee as reflexively as I write checks for electricity and heat. And I'm flushing money down the drain—at least according to a small army of *PC World* readers who have written lately to extol the virtues of their free ISPs.

These communiqués were prompted by our recent, decidedly lukewarm evaluation of free ISPs such as AltaVista, Freei.Net, and NetZero (www.pcworld.com/aproo/free-mail). We blundered, the letter writers contend, by reviewing the *wrong* freebie service providers. The contented customers of BlueLight.com, Freewwweb.com, and WorldSpy.net were particularly vocal.

So I gave those three free ISPs a whirl and found that the letter writers have a point. If all you need is an Internet connection and an e-mail address, a free ISP is worth a try. But I also discovered that the services don't come close to matching the features of a for-pay provider. In other words, my ISP (and possibly yours as well) earns its keep.

WHAT PRICE FREEDOM?

NO SECRET HERE: On the Web, *free* is a euphemism for *marketing vehicle*. In the case of BlueLight, the marketer in question is Kmart, which operates the service in partnership with Yahoo. When you sign up, you're forced to answer five screens of nosy questions about your income, education, and other personal matters. Then, whenever you're online (except at Yahoo), BlueLight confronts you with a small window of targeted advertisements.

True, one more billboard on the advertising-infested information highway is no big deal. But this window is particularly in-your-face: It floats on top of your browser, can't be shoved completely off-screen, and always seems to be in the way. So sorry, Kmart—you won't become my new ISP anytime soon.

Freewwweb and WorldSpy are more intriguing. Their sign-up forms demand only mundane facts like your current e-mail address, and neither defaces your desktop with an advertising window. The only unavoidable salesmanship happens when you log on to the Net: Each service automatically takes you to its own ▶

On the Net...

The Day the Music Died: My.MP3.com, the put-your-CDs-online service that I (mostly) applauded in June, is no longer its old self. After losing a legal tussle with the major recording labels, MP3.com has disabled the service's ability to play most music. The company says that it hopes to revive the service in a label-sanctioned form, but I'm not holding my breath... **Quick PC Tune-Up:** Stop by PC PitStop (www.pcpitstop.com) for a free diagnosis of your computer's health that runs right in Internet Explorer 4.0 and above—the site interrogates your PC while you wait. The checkup alerted me to performance hits and security risks I'd never have caught otherwise... **Get Thriftier:** If you have a sneaking suspicion you're paying too much for phone service, gas or electric utilities, loans, or insurance, LowerMyBills.com warrants a visit. The new site's blend of consumer tips, information, and online shopping adds up to a useful reality check that could save you some bucks.

GIMME FIVE

Top Search Engine Sleepers

DO YOU YAHOO? Probably. But lots of lesser-known search sites also deliver the goods, including these five specialized services:

1. RefDesk.com: Run by muckraker Matt Drudge's dad, this site's a portal to all things factual—dictionaries, almanacs, white pages, and much more.

2. Ditto.com: Whether you're looking for a picture of George Washington or George Clooney, the image-centric Ditto can track down the graphic you seek.

3. SearchBug.com: This Yahoo-like hub catalogs search sites of all types, and provides forms that let you run queries on other sites right from within SearchBug.

4. SearchSport.com: Your guide to the wide, wide world of sports on the Web—from baseball and hockey to street luge and korfball (korfball?).

5. MetaCrawler.com: Query 13 major search engines in one fell swoop—or peep at what other folks are searching for at that very moment.

ILLUSTRATION: MICHAEL KLEIN; ICONS: JEFFREY PELO

home page/shopping site. But once these force-fed home pages load, you can go where you will.

But do Freewwweb and WorldSpy monitor your wanderings around the Web, as some free ISPs do? Good question—especially considering that posted privacy policies are vague at WorldSpy and nonexistent at Freewwweb. (And a name like WorldSpy doesn't exude a strong sense of anonymity.) So I asked, and both ISPs told me that they don't track the surfing habits of individual users.

LACK OF LUXURIES

WORLDSPY'S SOFTWARE, a trim 1.4MB download, is a snap to set up; Freewwweb's default installation, on the other hand, requires a 22MB download, with a full copy of Netscape Communicator that you probably don't need. (You can sidestep that gargantuan download by manually configuring your PC to connect to Freewwweb, but it's a tedious job.) Once I was up and running, the services felt very much alike. At home in Boston, I consistently got connections of at least 50 kbps and never ran into a busy signal. However, on a San Francisco jaunt, I found that neither could muster more than 32 kbps, and WorldSpy's line was occasionally busy.

Neither service is exactly brimming with luxuries. Among the missing items: space for a personal home page and overseas dial-up numbers. (Freewwweb has access points in Canada; WorldSpy is U.S.-only.) WorldSpy also lacks Usenet newsgroups. My current fee-based ISP, by contrast, provides all these features and more—and I use 'em.

Moreover, if you need to phone for tech support, Freewwweb suddenly turns pricey. You must fork over $15 a call, a fact not mentioned on Freewwweb's site. WorldSpy's support is free and toll-free—one reason it's the ISP I'd choose if I went the free route.

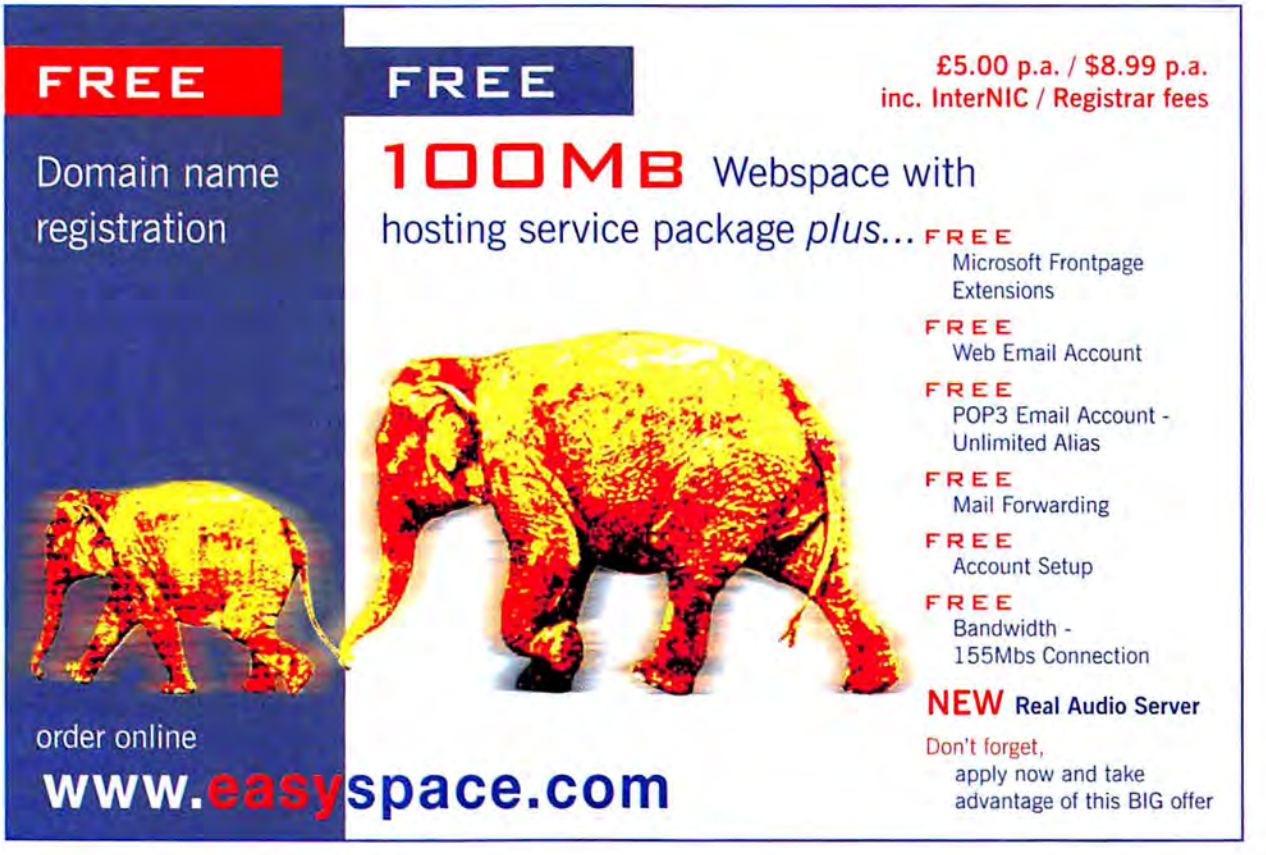
FYI

WHAT DO CYBERSHOPPERS seek in an online store? Guaranteed security, discounted prices, and free shipping are the biggest draws, reports a new survey.

SOURCE: CYBER DIALOGUE

Of course, free ISPs may beef up their features over time—in fact, WorldSpy says it plans to add home-page space and newsgroups. Once that happens, I might be tempted to dump my current ISP. But for now, its fee still seems like a reasonable deal. It works out to about 65 cents a day, less than I shell out to get the dead-tree edition of the *New York Times* delivered to my doorstep. Although come to think of it, I could also read the *Times* for free on the Web. Am I a wanton spendthrift or what?

Contact PC World *Executive Editor Harry McCracken at websavvy@pcworld.com.* ■



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Help Your PC Beat the Heat

WHO NEEDS A campfire when you can roast marshmallows over your PC? I'm only half joking. I recently checked the temperature inside my PC's case and was shocked to discover it was nearly 110 degrees. That kind of heat can kill some PC components.

I'll bet your PC is running hot, too, especially if you've souped it up with add-ons. But I've found two nifty tools for monitoring your PC's temperature and a few tricks to cool your CPU.

TOO DARN HOT

A BUDDY OF MINE who repairs PCs for a living says heat shortens the life of a PC faster than Intel releases new processors. If your PC freezes up suddenly, or you get sporadic write errors to the hard drive, you may have heat damage.

The ideal temperature inside your PC is roughly 5 degrees higher than the ambient room temperature. If the temperature in your case exceeds a toasty 110 degrees Fahrenheit, then your PC could be in trouble. That's because for each 18-degree increase above 110 degrees, the component life of your PC is reduced by half.

So how do you know when it's too hot?

I tested a dozen obscure utilities (hey, that's why I'm here) that measure your PC's body heat, and I found two that I liked. Both programs monitor the temperature of your CPU (which may get hot before the inside of your case does) and make sure that the fans are functioning.

If you add components to your PC, expect it to sizzle. That's because peripherals produce lots of heat.

The first utility is Hmonitor Lite, a lean, no-frills tool that costs $20 and monitors your system's essential components. It sets off an alarm if any part starts to swelter. (My alarm is set to play a WAV of taps.) The second one is MotherBoard Monitor (see July's *Hardware Tips* at www.pcworld.com/julOO/hardware), a freebie that monitors everything Hmonitor does, with one neat extra: It also e-mails you an alert when the alarm goes off ("Help! I'm getting hot under the collar"—Signed, Your PC). You can find MotherBoard Monitor at FileWorld. For these utilities to work, though, your PC must have a modern motherboard. To find out if it does, load either utility and see if its gauge (which you can put in the system tray) shows temperature levels.

Once you've installed these utilities, you can run a fire drill to test them: Go to Windows Find (*Start•Find*), launch two search sessions, and insert a word into the Containing Text box. Temperatures will inch up, and alarms will sing. (To put out the controlled burn, cancel the search.)

SIZZLING ADD-ONS

ANY HARD-DRIVE-INTENSIVE activity will heat up your drive. But if you add components to your PC, expect it to sizzle: That's because peripherals produce lots of heat. I fitted my PC with a second SCSI drive, running at 10,000 rpm. With both drives going, the surface temperature got high enough to blister my finger. When I added a 3D video card, the inside of my PC rose to 109 degrees in no time at all, and during periods of intensive disk activity, it approached Saharan levels.

A cheap, simple solution? I added a $29 Bus-Cool fan to a vacant slot on my motherboard. The temp fell to a tropical 101 degrees. Then I popped in a $49 Bay-Cool, a gizmo that blows cool air on my hard drive. The temperature sank to a milder 98 degrees.

Look, I don't mean to scare you. If you have a system with no fancy video cards and just one hard drive, you're probably okay. But even an unadorned PC can overheat if the cooling fan is blocked.

Another heat culprit? Dust. Check the grate on your PC's power supply fan. Dirty, no? I found lots of schmutz—layers of grit, dust, and dog hair—on mine.

I disconnected all the cables, took the PC outside, and blasted it with a can of ozone-free compressed air. For good measure, I vacuumed the inside of the case, all the components, and the floor. My PC breathed a sigh of relief.

I still have moments when I push my PC too hard and it overheats, but at least now I know when it's happening and can act accordingly—like unplugging my hot plate and multitasking with my PC.

Speaking of which: Do you want milk with that s'more?

Bay-Cool, Bus-Cool
Bay-Cool $49, Bus-Cool $29; PC Power & Cooling, 800/722-6555, www.pcpowercooling.com

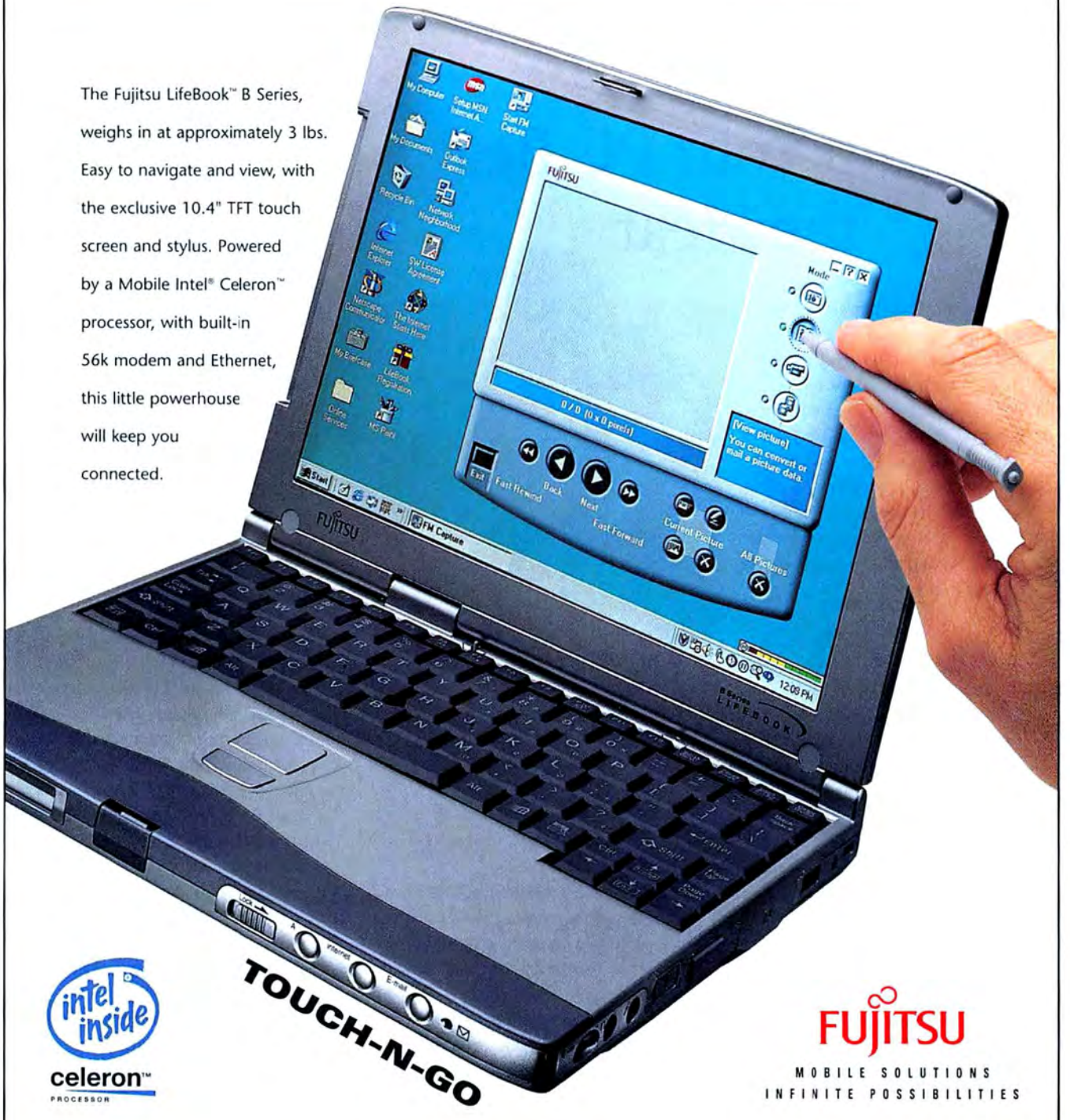
Hmonitor Lite
$20; Alexander Berezkin, hmonitor.com

MotherBoard Monitor
Free; Alex Van Kaam, members.brabant.chello.nl/~a.vankaam/mbm

online *Download programs noted here at www.fileworld.com. Contributing Editor Steve Bass is president of the Pasadena IBM Users Group. Write him at steve_bass@pcworld.com.* ■

ILLUSTRATION: GREG CLARKE

The Fujitsu LifeBook™ B Series, weighs in at approximately 3 lbs. Easy to navigate and view, with the exclusive 10.4" TFT touch screen and stylus. Powered by a Mobile Intel® Celeron™ processor, with built-in 56k modem and Ethernet, this little powerhouse will keep you connected.



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celeron™
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Fujitsu recommends Windows® 2000 Professional for business.

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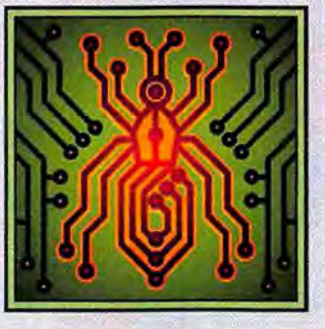
Outlook E-mail Security Update ◆ Office 2000 security fix ◆ Three-in-one IE patch

Ouch! Outlook's Virus Vaccine Hurts



IN THE WAKE of May's worldwide "love bug" virus attack, Microsoft has come up with a way to inoculate Outlook 98 and 2000 from similar viruses. But like many other vaccines, the Outlook E-mail Security Update has some unpleasant side effects. As a default, the fix prevents Outlook users from receiving many types of e-mail attachments, and it conflicts with features in other programs, including Microsoft Office.

Microsoft's Outlook fix has two prongs. "I Love You," Melissa, and other viruses wreak their havoc through executable code attached to e-mail messages. So the update prevents users of Outlook 98 and 2000 from receiving attachments that contain executable code, including .exe and .com files and script modules such as .vbs and .js files.

Both " I Love You" and last year's Melissa virus e-mailed themselves to users listed in the address books of infected PCs. To prevent viruses from broadcasting themselves to everyone you know, the update will warn you whenever another application tries to access your Outlook address book or send e-mail via Outlook.

Corporations burned by "I Love You" or Melissa will likely welcome the update, but users accustomed to the convenience of sharing files by e-mail may find it a hard pill to swallow. By default, the update blocks various file types, like Microsoft Access Projects and self-extracting zipped files. The update also prevents some features in other apps (including Microsoft Office's mail-merge and Palm synchronization software) from working at all.

So if you take your medicine, how can you share the banned file types? Microsoft recommends using servers within your company's network or using Web-based file storage locations. At press time, Microsoft reported that administrative tools would be added to allow customization of the new security measures.

Get the update for Outlook 98 or 2000 at www.officeupdate.microsoft.com. Office 2000 users must install the SR-1 or SR-1a update before installing the Outlook E-mail Security Update. So far, there's no security update for Outlook Express. Microsoft officials are deciding whether to produce one.

OFFICE 2000 SECURITY FIX

MEANWHILE, THE Microsoft Office team has been working to close another security breach: In Office 2000 and its individual apps, such as Excel and Word, a hacker could exploit an ActiveX control that automates demonstrations in the Office help files to turn your files to mush. Microsoft admits that the security hole exists because Microsoft incorrectly labeled the code as "safe for scripting." An HTML e-mail message or the host of a Web site you visited could introduce a destructive script armed with the ActiveX control into your PC. To find a link to the 149KB patch and to get instructions for installing the fix, hop to officeupdate.microsoft.com/2000/downloadDetails/Uactlsec.htm.

Files from this article are available on PC World Online at www.fileworld.com/magazine. Mitt Jones is a contributing editor for PC World. ■

IN BRIEF

IE Security Triple Play

MICROSOFT'S LATEST SECURITY update to Internet Explorer (versions 4 and 5) bundles fixes that repair three weak links that could let bad-guy Web site operators have their way with your system. The most dangerous of the three could permit a Web site operator to perform any action on your system that you could do, including reformatting the hard disk. The other two security breaches could allow site operators to read some types of files on your system without your permission and to access cookies they should not be able to read. For installation instructions and a link to the 1959KB download, simply point your browser to www.microsoft.com/windows/ie/download/critical/patch7.htm. Installing the patch requires having IE 4.01 Service Pack 2 or IE 5.01 in place first.

Holes Bug Eudora, Too

MICROSOFT ISN'T THE only software company struggling with e-mail security. Qualcomm has issued an E-mail security advisory about a weakness in its Eudora e-mail package. Eudora 4.2 and later versions ask the user for permission to proceed before opening most types of file attachments, including programs such as .exe files. But a recently discovered vulnerability allows an .exe file introduced through a link attached to the message to run unannounced. The security advisory also warns that .vbs files—the type of attachment the "I Love You" virus rode in on—can execute without warning. Qualcomm says that the 4.3.2 version of Eudora adds alerts for all .exe and .vbs files. The advisory provides steps for solving the problem yourself for versions 4.2.1 and later. You can find the advisory by visiting www.eudora.com/security.html.

BUGGED?

FOUND A HARDWARE or software bug? Tell us about it via e-mail at bugs@pcworld.com.

ICON: JEFFREY PELO

TOP OF THE NEWS

AMD to Intel:

Take That, PIII

By Carla Thornton

A JAB OF megahertz here, an uppercut to the cache memory or bus speed there. So goes the fight between Intel and AMD as the two major chip makers spar in the ongoing battle for the title of fastest processor.

In the last round back in March, AMD beat Intel to the punch—by a week—by releasing the first 1-GHz chip for desktop PCs. But Intel's 1-GHz Pentium III processor performed a hair faster than AMD's 1-GHz Athlon CPU—about 5 percent faster on our tests of business apps.

Now AMD is swinging back with a new Athlon processor, code-named Thunderbird, that closes the small performance gap. The new Athlon chip differs from its predecessor in one significant respect: Its Level 2 cache memory is integrated into the processor, so that this memory runs at full speed. That's not groundbreaking—Intel's Coppermine Pentium III chips have had on-die, full-speed Level 2 cache since last October. But our first tests show that T-bird did its intended catch-up job.

AMD will sell the new Athlon processor in speeds ranging from 750 MHz to 1 GHz. We tested two preproduction PCs equipped with the new chips: Compaq's Presario 7000Z-900, with a 900-MHz Athlon Thunderbird; and CyberMax's Enthusiast K7-800, equipped with an 800-MHz T-bird. Both PCs came with 128MB of 100-MHz SDRAM, Windows 98 SE, a 40GB hard drive, DVD-ROM and CD-RW drives, and a 19-inch monitor.

Since AMD is not charging a premium for the improved chip, these new Thunderbird systems won't cost you any more than the original Athlons. Looking for a deal in a power desktop? Our CyberMax system checks in below $2200 and runs business applications nearly as efficiently as 1-GHz systems, which start at about $2900.

Thanks to improved cache memory, AMD's newest Athlon chips catch up to Intel's latest PIIIs. In our tests, the first Athlon Thunderbird systems show knockout speeds.

Opposite page: CyberMax's K7-800 (left) and Compaq's Presario 7000Z-900.

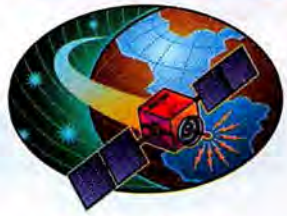
PERFORMANCE PUNCH

SYSTEMS WITH the older Athlon processor will be around as late as August, says AMD spokesman Drew Prairie. So be careful when you're shopping. The new Athlons will be advertised as "AMD Athlon processor with performance enhancing cache memory"—an ungainly name for a sleek chip.

Full-speed Level 2 cache was the only item on AMD's to-do list still needed to bring the Athlon's performance up to that of Intel's Coppermine Pentium III. The old Athlon provided more L2 cache—512KB—but it was located off the chip, which meant that it ran at between half and a third of the chip's speed, depending on the processor. In addition to 128KB of Level 1 cache, the Athlon Thunderbird has 256KB of Level 2 cache on the chip itself, for a grand total of 384KB of full-speed system cache. The Coppermine Pentium III processors also provide 256KB of on-die Level 2 cache, but they have only 32KB of Level 1 cache, for a total of 288KB.

AMD told us that computers with the improved Athlon processor would run typical business applications faster than the old Athlon systems by one speed grade—or about 50 MHz. They also said that the new processor would deliver an even bigger improvement with data-intensive applications such as CAD. Our first tests seem to bear out both of these claims.

In PC WorldBench 2000 performance tests, which run Microsoft Word and Excel and other business apps, the new Athlon processor's on-die cache gave it a small but measurable performance boost over the Athlon machines that used the old off-die memory scheme. The Thunderbird PCs performed in the same range as PIII systems with the same processor speed. ▶



Product Pipeline

➤ **Gateway, AOL Team on Net Appliance:** The new Internet appliance will have speakers and a touch screen and will offer AOL Net service. Prices should be under $500, with the first model scheduled for a holiday release. A surprise: The appliance runs on Mobile Linux and Transmeta's Crusoe processors, not Wintel.

Tidbytes

➤ **Bye-Bye Number Nine:** Familiar graphics boards vendor Number Nine Visual Technology filed for bankruptcy late last year and has now closed its doors for good. You can still access drivers and FAQs via Number Nine's Web site (www.nine.com), but no further phone support or repairs (even under warranty) are available from the company.

➤ **Motherboard Alert:** Shipping since last November, Intel 820 motherboards using SDRAM have a faulty part—the Memory Translator Hub—which may lead to system hangs and possibly data corruption. Intel offers a utility to let you check whether your board has the faulty part; download it at www.intel.com/support/mth. If you have one of the boards, contact your PC vendor, who may offer refunds or exchange the faulty part for a new 820 board with RDRAM. Contact Intel only if you bought your board directly from Intel. ▶

GET UP-TO-THE-MINUTE NEWS about company products and Internet happenings from PCWorld.com's News area. Just point your browser to www.pcworld.com/pcwtoday.

PHOTOGRAPH: ROBERT CARDIN; ICONS: JEFFREY PELO

BUSINESS APPS TEST REPORT

Newest Athlon Systems Catch Up to Pentium IIIs...

SYSTEM	CPU	RAM (MB)	Level 2 cache (KB)	PC WorldBench 2000 score (Faster)
CyberMax Enthusiast K7-800	Athlon-800 Thunderbird	128	256	153
Compaq Presario 7000Z-900	Athlon-900 Thunderbird	128	256	153
Average of three systems	Athlon-800	128	512	145
Average of two systems	Pentium III-800	128	256	153
Average of two systems	Athlon-900	256	512	151
One system	Athlon-1000	128	512	155
Average of three systems	Athlon-1000	256	512	158
One system	Pentium III-1000	128[1]	256	165

TEST PC WORLD CENTER **HOW WE TEST** All systems are tested with PC WorldBench 2000, *PC World*'s application-based benchmark. A higher PC WorldBench 2000 score is better. Data based on testing conducted by the PC World Test Center. All rights reserved. [1] This system has RDRAM; all others use SDRAM. Number highlighted in red represents best score.

Would you really notice much of a difference in speed between the old and new Athlon systems in everyday work with ordinary office applications? Probably not. The gains that we saw were enough to put Athlon scores alongside those of the Pentium III, but not enough to appreciably speed up everyday tasks. On the other hand, if you work in CAD or other data- and graphics-intensive applications, you should see a noticeable difference.

THE SYSTEMS WEIGH IN

A SPOT CHECK of vendors that sell both Athlon and Pentium III desktop PCs revealed prices to be about the same at equal clock speeds. So choose carefully. If you push your PC to the limit with heavy number-crunching or graphical operations, opt for an Athlon Thunderbird machine with the best graphics card available. If you use mostly Microsoft Office–type apps and a Web browser, note that power desktops with 800-MHz to 1-GHz Athlon, Athlon Thunderbird, and PIII chips will perform quite similarly. You'll save hundreds of dollars by opting for an 800- to 900-MHz system and may never miss the last bit of speed you'd get from a 1-GHz box.

Bargain-oriented vendors may offer the best deals on Thunderbird PCs. The CyberMax Athlon-800 machine, for instance, costs $2149—almost $800 less than Compaq's $2930 Presario 7000Z-900. Though you get a faster Athlon processor with the Compaq, the two systems performed virtually the same on business apps in our tests.

The CyberMax Enthusiast K7-800 earned a PC WorldBench 2000 score of 153, identical to that of the average of two desktop PCs equipped with Pentium III-800 chips, and about 5 percent better than PCs with the original Athlon-800 chip.

The 900-MHz Compaq Presario 7000Z-900 also earned a PC WorldBench score of 153, a disappointing performance

GRAPHICS TEST REPORT

...and They Really Stand Out on AutoCAD Test

			Quake III (frames per second)		Unreal Tournament (frames per second)		TriSpace (frames per second)	3DMark2000		AutoCAD (seconds)
SYSTEM	CPU	Graphics memory (MB/type)	800-by-600 32-bit color	640-by-480 16-bit color	800-by-600 32-bit color	640-by-480 16-bit color	1024-by-768 32-bit color	Overall index	CPU test	1024-by-768 32-bit color
CyberMax Enthusiast K7-800	Athlon-800 Thunderbird	32/SDRAM	60	115	55	61	14	3843	305	619
Compaq Presario 7000Z-900	Athlon-900 Thunderbird	32/DDR	83	122	56	62	16	4440	317	614
Average of three systems	Athlon-850	32/SDRAM	58	116	44	55	14	3906	323	700
Dell Dimension XPS B-866	PIII-866	64/DDR	82	119	60	64	28	4645	317	630
Compaq Presario 5900Z-1GHz	Athlon-1000	32/SDRAM	63	123	31	42	16	3957	381	634
Gateway Select 1000	Athlon-1000	32/SDRAM	49	120	54	61	16	4007	316	625

TEST PC WORLD CENTER **HOW WE TEST** In our Quake III and Unreal Tournament tests, we measure the self-running demo frame rates produced by each PC at 800 by 600 resolution and 640 by 480 resolution. In Caligari TrueSpace 4.2, a 3D modeling program, we measure the frame rate of a tutorial that uses AGP textures. In MadOnion.com's 3DMark2000 benchmark, the test generates a composite overall index score based on image quality, image rendering, and CPU capability (CPU test broken out separately above). In the AutoCAD 2000 test, we time the Autodesk User Group International's AUGI Gauge benchmark, which runs computer-aided drafting tasks. Data based on testing conducted by the PC World Test Center. All rights reserved. Numbers highlighted in red represent best score on each test.

compared with that of the 800-MHz CyberMax and the PIII-800s. (Compaq machines run a lot of utility software in the background, which tends to slow them a bit on these tests.) But the new Compaq did match the performance of an earlier Compaq equipped with a 1-GHz original Athlon.

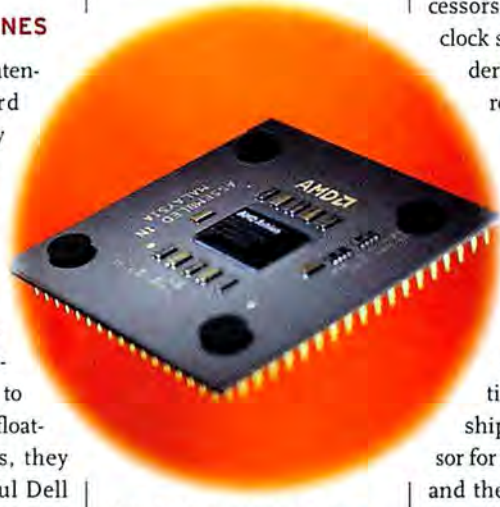
No 1-GHz Athlon T-bird machines were available by our deadline, so we couldn't pit them against Intel's 1-GHz Pentium III. Both the CyberMax and Compaq PCs ran business applications about 7 percent slower than a 1-GHz PIII. That's not a very significant difference on this suite of tests (see Business Apps Test Report, page 46).

BEHIND THE SCENES

IN OUR GRAPHICS-intensive tests, the T-Bird computers generally performed better than counterparts that had the older Athlon chip, but both really shone in AutoCAD tasks, where they easily beat previous Athlon systems. Probably thanks to the Athlon's superior floating-point capabilities, they also outran a powerful Dell PIII-866 system by about 2.5 percent in the AutoCAD test. Both PCs came with graphics cards based on NVidia's GeForce 256 chip set; the Compaq's card, using DDR memory, helped that PC perform notably better than the CyberMax in many tests (see Graphics Test Report, page 46).

These are good times for AMD, a long-beleaguered David that has stumbled more often than it has stood up to Intel's Goliath. Its new Athlon Thunderbird chip matches the Pentium III, which means AMD once again fuels desktops just as powerfully as Intel does. And with a new plant gearing up in Dresden, Germany, AMD appears to have a handle on supply. The profits front looks auspicious, too. In the first quarter of 2000, AMD sales broke a billion dollars for the first time, with $189 million in profits—almost triple its 1999 fourth-quarter earnings. That's still a far cry from Intel's $2.7 billion first-quarter net income, but it's quite a turnaround from AMD's 1999 second-quarter loss of $162 million.

Throughout this year, Intel has run up against a supply shortfall in its top-end processors, an unusual problem for the chip giant. By the third quarter of this year, the company should be shipping its 1-GHz Pentium III chips in volume, reports Intel spokesperson George Alfs. At press time in June, a spot check of major system vendors revealed that several of them were still waiting for the 1-GHz Pentium III. These Intel shortages have helped AMD.



ATHLON THUNDERBIRD CPUs match up well against Intel PIIIs.

But by this fall, Intel could steamroll Athlon with its long-anticipated Willamette processor for high-end desktop PCs. Willamette is expected to debut at 1.4 to 1.5 GHz and use an entirely new microprocessor architecture, including a 400-MHz front-side bus and a chip set that will use Rambus memory. This fall AMD also plans to release its second-generation Athlon chip set, the 760, which will add support for a 266-MHz system bus and DDR main memory, which is cheaper than Rambus memory. Athlon processors will challenge Intel's clock speeds for the remainder of the year, says AMD representative Prairie.

In the second half of 2000, AMD plans to release a server version of Athlon, code-named Mustang, that will hold up to a megabyte of on-die cache. In addition, the company will ship its first dual processor for high-end workstations and the first mobile Athlon chips for laptops. Finally, the Duron, a budget derivative of the Athlon, will replace the AMD K6-2 chip. The Duron was set to debut in early June, but no systems were ready for testing at that time.

WHO'LL WEAR THE BELT?

AMD CURRENTLY owns about 12 percent of the budget processor market and 7 percent of the high-performance market, according to U.S. Bancorp ▶

Site to See: Business.com

WHY USE a general search engine if you need industry-specific data for a report? Try Business.com, which permits a more

specialized search of "Departments" and "Industries" such as Management and Advertising, with hand-picked listings by the site's employees. The site should also now offer news, press digests, and profiles of 10,000 companies in 57 industries. Kept fresh, it could be a great tool.

Top PC World Downloads

1 Memory Cleaner
40KB, 17,296 downloads
Releases memory still tied up by closed applications.

2 CPU Stability Test
381KB, 16,756 downloads
Tunes your PC by running multithreaded tests of your CPU.

3 Norton AntiVirus Definitions With W97M.Melissa.BG Virus Protection
2.50MB, 12,948 downloads
Update protects systems from the 'Resume–Janet Simons' version of the Melissa macro virus.

4 W97M/Melissa.bg Update for McAfee VirusScan 95/98
1.97MB, 7325 downloads
Protects systems from the 'Resume–Janet Simons' virus.

5 Clean System Directory
72KB, 6640 downloads
Improves system performance by removing unused DLL files.

Download files can be found on www.pcworld.com/fileworld/top5.

PHOTOGRAPH: ROB CARDIN

Piper Jaffray. AMD hopes to increase its total share to 20 percent by the end of the year.

But that may be pie-in-the-sky, according to Ashok Kumar, managing director of U.S. Bancorp. Kumar says AMD's current market-share numbers are misleading because they include business inherited from failed competitors, like Cyrix and Centaur. AMD has yet to make inroads into Intel's corporate PC stronghold, and it may even lose ground in the value segment when it introduces Duron, Kumar says.

"All of AMD's value competitors basically have disappeared," bequeathing AMD the 10-plus percent market share they had two years ago, says Kumar. "And it will be difficult for vendors to support Duron, which will use a brand-new chip set and motherboards. I'm afraid AMD is stretching optimism beyond the bounds of reason to think they can capture anything beyond 20 percent."

Keith Diefendorff, editor in chief of *Microprocessor Report*, agrees that AMD still faces a brutal fight. "It's one thing to come out with a product like Athlon and give Intel a bloody nose; it's another thing to compete with Intel, product after product, and stay ahead." To crack the high-end business market, he says, "AMD has to sell server processors, and that's more than just putting out a piece of silicon. You have to support it with a high-quality chip set." That's a relatively new business for AMD.

Whatever the future brings, PC buyers currently benefit from AMD's presence with competitive prices and extremely powerful PCs for demanding applications. If you want a fast, loaded PC, an Athlon system with performance-enhancing cache memory may be a true champ.

Compaq Presario 7000Z-900
Street price: $2930; 800/345-1518; www.compaq.com

CyberMax Enthusiast K7-800
Street price: $2149; 800/443-9868; www.cybmax.com

Money for Nothing? Rambus Performance Falls Short

REALITY CHECK

FOR MONTHS, we've wondered when Rambus dynamic RAM would begin to demonstrate real-world performance benefits that match its high cost. We're still wondering. Head-to-head against today's standard SDRAM PC memory, it's a tie, at best.

PCs shipping with RDRAM since last fall have quelled some complaints about the pricey new memory by delivering a number of good benchmark results. But it has been hard to tell if other factors, like souped-up 3D graphics boards or faster processors, were responsible for improved performance. To clear the air, we isolated the effects of RDRAM by testing identically configured 800-MHz PCs that use either RDRAM or SDRAM technologies.

The upshot: RDRAM delivers only a slight performance advantage to some graphics-intensive software but offers virtually none to office applications. RDRAM could come into its own when faster, more demanding CPUs from Intel arrive, and if multitasking of data-intensive software becomes more common. But it must contend with the new Double Data Rate DRAM memory technology.

THINGS BEING EQUAL

THE PC WORLD Test Center custom-built two of the test PCs using Micro Express cases and Intel and Asus motherboards. We also tested two PCs from Dell and four custom units from Micron Technology. All PCs were tested with our PC WorldBench 2000 suite of office applications, graphics programs, and more.

A Dell Dimension PC using RDRAM on a 700-MHz bus between CPU and memory (called PC700) scored 151 on PC WorldBench 2000, just a point higher than a fellow Dell with 100-MHz (PC100) SDRAM. The four Microns, representing RDRAM, DDR SDRAM, PC100 SDRAM, and the new 133-MHz (PC133) SDRAM, also showed negligible differences on this test.

On our Quake III test and MadOnion.com's 3DMark2000 tests, DDR and PC133 SDRAM PCs performed a shade faster in most runs than RDRAM units. But RDRAM consistently nosed out a win on the AutoCAD test. Usually trailing, but not by more than 10 percent, were systems with PC100 SDRAM, probably because they have the slowest memory bus. Save for these PCs, most users would be hard-pressed to notice any differences.

PROS AND CONS

RAMBUS's biggest strength is its high throughput, which lets it pump three times more data per second than PC100 SDRAM. Its alleged weakness is *latency*, the delay between the time data is requested

ILLUSTRATION: JON CONRAD; PHOTOGRAPHS: ROBERT CARDIN

from memory and when it's delivered to the CPU. Current CPUs, software, and tests tend to exacerbate Rambus's shortcomings and work against its strengths, say memory experts.

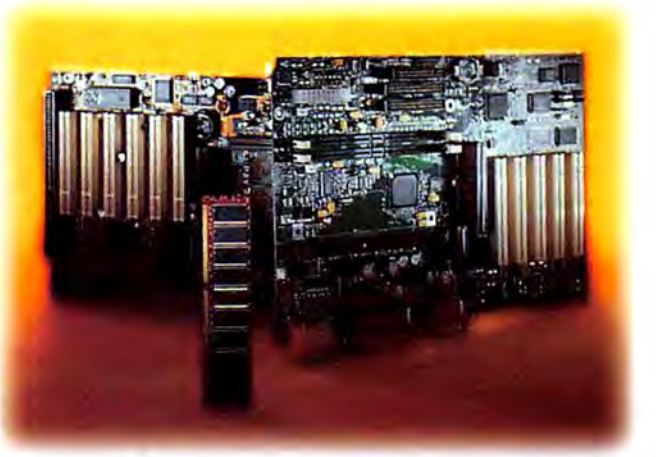
Longer latency hampers performance in programs like word processors and certain databases, which tend to jump around a lot making small data requests from memory. It's less of a problem when you're watching DVD movies or editing video, where megabytes of data get blasted out, then stop for a while. RDRAM's greater throughput also comes into play with these types of applications. But as Nathan Brookwood, principal analyst at Insight 64, put it, "The benefit [of Rambus] compared with the pricing is out of line."

ONE OF THE first DDR PCs, built for us by Micron Technology.

RDRAM typically adds $150 to $350 to the cost of a preconfigured PC—not an absurd premium, but disproportionate to its slight speed increase. It's on upgrade chips where price differences are stunning. One May posting at Kingston Technology's ValueRAM.com site listed 128MB of the slowest, cheapest RDRAM for $370 more than the fastest non-DDR SDRAM, and 256MB RDRAM modules for $750 more than 256MB of PC133 SDRAM.

Prices should drop as vendors learn to make RDRAM more cheaply. "A year from now, I think a price premium for Rambus in the range of 25 percent compared to SDRAM is very achievable," says Avo Kanadjian, Rambus vice president of worldwide marketing.

What's so great about a premium of *only* 25 percent?



ONE MOTHERBOARD does not fit all. If you have a Rambus motherboard, you will not be able to switch to DDR, or vice versa.

ENTER DDR

INTEL archrival AMD favors DDR over RDRAM. Its price premium is better—8 to 10 percent for now, expected to drop to 5 percent when volume production begins, says Semico Research vice president Sherry Garber. And DDR should have less of a latency problem than RDRAM.

But while DDR's maximum throughput is twice that of current SDRAM and competitive with RDRAM, it won't approach that of a forthcoming dual-channel RDRAM. Motherboard design issues related to DDR's wide data bus caused some concern, too.

Bob Eminian, vice pres- ▶

Intel's Latest Chip Set Chronicles

FILLING A GAP in its motherboard lineup, Intel has just released three new chip sets. The 815 and 815E support PC133 SDRAM and finally give a choice to mainstream users who want extra speed but don't want to pay Rambus's high premium. To shore up its 820 chip set line and satisfy high-end users, Intel has brought out the 820E, which lacks the memory problems of previous 820s.

Like the older 810 and 810E chip sets, the 815 and 815E have integrated graphics. That design saves money but, in the case of the 810s, left you with no real upgrade options. That's not true of the 815s. With those chips, PC vendors can offer three levels of graphics quality: standard integrated, integrated with a 4MB 3D graphics accelerator, and with a 4X AGP slot for a third-party graphics card.

Expect the 815 and 815E in midrange PCs from major vendors such as HP and Micronpc.com. Micron's ClientPro Cns, for example, will feature the 815E in a standard configuration with a Pentium III-667, 128MB of RAM, a 15GB drive, the 4MB 3D graphics accelerator, a 17-inch monitor, and Windows 2000. It will list for $1499. Look for other vendor announcements later this summer and fall.

The Rambus-only 820E lacks the memory translator hub that caused the recent recall of previous 820 SDRAM-based boards. It also features a new I/O Controller Hub 2, or ICH2, which replaces the 820's original ICH. The ICH2 supports high-end features such as the fast ATA/100 hard drive standard (up from ATA/66), full six-channel stereo sound (up from two channels), and four USB ports (up from two). The ICH2 also supports three integrated LAN options: two 10/100 ethernet options, and a 1-mbps home phone line alternative. It also offers a more flexible add-in solution for cards based on the Communication and Networking Riser specification. Like the 820E, the 815E includes the ICH2, while the lower-priced 815 uses Intel's original ICH.

No major vendors are expected to offer 820E PCs at the chip set's launch; you should see them in high-end PCs this fall.

The 815 chip set should have a long, successful life. The 820E, however, won't reside at the top for long. Intel's next-generation, 1-GHz-plus Willamette processor, expected in the second half of the year, will use a new chip set, code-named Tehama.

–Tom Mainelli

Memory Unmuddled

DDR SDRAM: Double Data Rate SDRAM, an upcoming system RAM technology, borrows a technique from RDRAM to double SDRAM's data-transfer rate to roughly RDRAM speeds.

PC-100 SDRAM: Synchronous DRAM (the workhorse of modern PCs) running at 100-MHz bus speed.

PC-133 SDRAM: Synchronous DRAM running at 133-MHz bus speed.

RDRAM: Rambus DRAM can run about three times faster than typical SDRAM. The current version supports bus speeds between 600 and 800 MHz, and is often identified as PC600, PC700, or PC800.

ident of marketing at Samsung Semiconductor, a manufacturer of all four memory types and the highest-volume RDRAM vendor, dismisses these concerns, saying designers have been working out technical issues for more than two years. "We're forecasting that by the end of next year, Rambus and DDR will hold about the same market share," Eminian says. (The forecast doesn't include DDR SDRAM in graphics boards.) Expect to see AMD Athlon PCs with DDR later this year; the memory is already appearing in high-end servers.

NO CASE FOR NOW

KANADJIAN says people will want RDRAM for playback of downloaded graphics files that will finally show Rambus in its best light. Eminian agrees. He also says RDRAM will show its value when businesses use Windows 2000's improved multitasking to do background data backups, network distribution of large files, and such.

Rambus will also get a boost from Intel's next generation CPU, code-named Willamette. Expected in the second half of this year, the new CPU will require the dual-channel Rambus. When Willamette eventually migrates down to midrange and even low-end PCs, RDRAM will enter the computing mainstream, Brookwood predicts.

RDRAM supporters cite "headroom" when asked why the average person should invest in RDRAM today. But the next-generation 1.5-GHz-and-up CPUs won't work in today's Rambus PCs, and several hundred dollars seems too much to pay for possibilities. Brian Zucker, a technology evangelist at Dell, agrees that as an investment, Rambus probably doesn't make sense for most people, and admits that Dell markets its RDRAM PCs as most appropriate for those with high-end computing requirements now.

Unless you're one of the few whose current apps show substantial gain with RDRAM, wait until the prices come down and software catches up. PC133 SDRAM should suit most of us, providing a minor speed boost on the business applications we typically use, for about the same price as today's PC100 SDRAM. With Intel finally releasing a motherboard that supports PC133 SDRAM, this memory should soon become the mainstream standard. DDR improves performance, but its immediate future is clouded by high cost and uncertain availability.

As for Rambus, no matter how you slice it, most people just don't need it yet.

—David Essex ▶

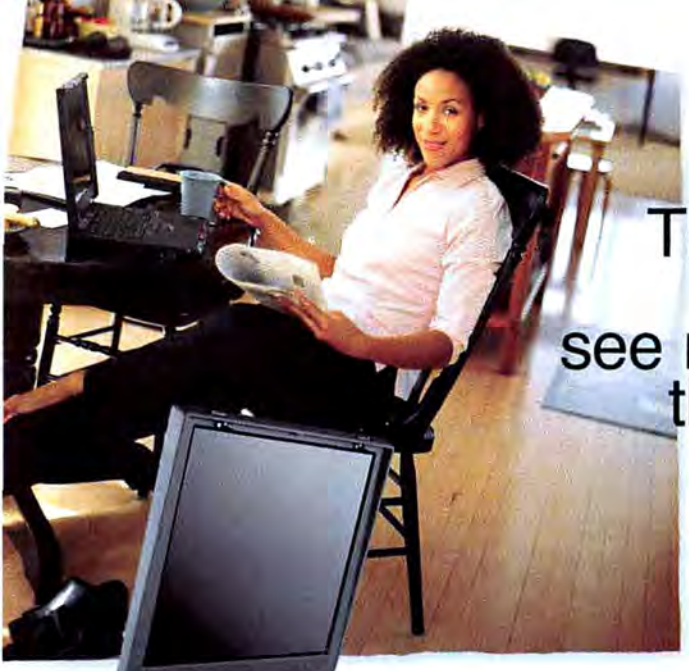
BUSINESS APPLICATIONS AND GRAPHICS TEST REPORT

Rambus Versus SDRAM: A Draw at Best

					Quake III (frames per second)		3DMark2000		
SYSTEM	Processor	RAM type (all 128MB)	Graphics memory (MB/type)	PC WorldBench 2000 score	(800-by-600 32-bit color)	(640-by-480 16-bit color)	Overall index	CPU test	AutoCAD (seconds)
Dell Dimension XPS B800r	Pentium III-800EB	PC700 RDRAM	32/SDRAM	151	63	104	4166	346	663
Dell Dimension XPS T800r	Pentium III-800	PC100 SDRAM	32/SDRAM	150	64	123	4071	314	673
Micro Express (custom)	Pentium III-800EB	PC800 RDRAM	32/DDR SGRAM	150	58	128	4731	320	683
Micro Express (custom)	Pentium III-800EB	PC133 SDRAM	32/DDR SGRAM	155	61	141	4864	360	747
Micron Millennia (custom)	Pentium III-800EB	PC800 RDRAM	32/DDR SGRAM	156	82	133	4781	358	654
Micron Millennia (custom)	Pentium III-800EB	PC2100 DDR SDRAM	32/DDR SGRAM	156	91	139	4833	361	656
Micron Millennia (custom)	Pentium III-800EB	PC133 SDRAM	32/DDR SGRAM	155	92	139	4813	356	655
Micron Millennia (custom)	Pentium III-800EB	PC100 SDRAM	32/DDR SGRAM	151	86	121	4659	313	728
				Faster					

TEST PC WORLD CENTER **HOW WE TEST** All systems are tested with PC WorldBench 2000, *PC World*'s application-based benchmark. A higher PC WorldBench 2000 score is better. In our Quake III tests, we measure the self-running demo frame rates produced by each PC at 800 by 600 resolution and 640 by 480 resolution. In MadOnion.com's 3DMark2000 benchmark, the test generates a value based on rendering frame rate as well as a separate score gauging CPU speed (CPU test broken out separately above). In the AutoCAD 2000 test, we time the Autodesk User Group International's AUGI Gauge benchmark, which runs computer-aided drafting tasks. On all tests except AutoCAD, a higher result is better. Data based on testing conducted by the PC World Test Center. For more details on PC WorldBench 2000 and how we run it, see www.pcworld.com/benchmark. All rights reserved. Number highlighted in red represents best score on each test.

ILLUSTRATION: JON CONRAD



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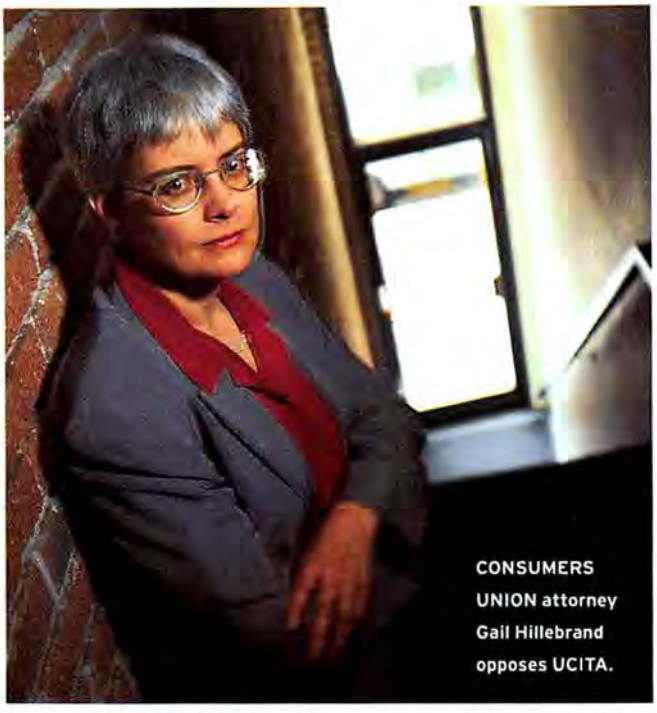
Devil in the Details? Software Law Could Be Hell for Buyers



CONSUMERS UNION attorney Gail Hillebrand opposes UCITA.

UPDATE

IF A CAR'S engine blows up because of a defect the manufacturer knew about, the people inside—or their next of kin—can expect to collect big-time damages. But what if defective software destroys valuable data on your hard drive? Under a model statute that state legislatures are now considering, you might have little or no recourse—even if the vendor knew about the bug—as long as the vendor's license disclaimed responsibility for any problems.

IN THE FINE PRINT

ALREADY adopted in Maryland and Virginia, the Uniform Computer Information Transactions Act is structured as a law governing software licenses—the fine print that comes with software bought shrink-wrapped or online.

But critics, including some two dozen state attorneys general and a number of consumer groups, say that it's more like a get-out-of-jail-free card for software publishers. UCITA, they say, allows the software industry to circumvent most consumer rights built into general contract law simply by disavowing them in licenses that people frequently don't read—or can't see—before they buy a product.

"The law makes it easy and simple to hide those terms from the customer," says Consumers Union attorney Gail Hillebrand.

The law doesn't stop with warranty disclaimers, either. It also allows vendors to prohibit you from reselling or even giving away software that you no longer use. In addition, vendors may create products that they can disable remotely if you violate the terms of your license.

There's more: An electronic notification provision would let a service provider change your fees without so much as an e-mail warning. Instead, the service could simply post a notice on its Web site.

The new law does stipulate that if you can't see the license before buying (common with shrink-wrapped software), you can return the product for a full refund if you decide you don't like the terms upon reading them. But what if that package was part of the software bundle that you received with your computer? Hillebrand says that your right of return probably does not apply to the PC.

UCITA started out as a controversial revision to the Uniform Commercial Code, a series of model laws most states follow that provide a consistent legal framework for commercial transactions not covered by federal law. Morphed into a stand-alone law, UCITA enjoys backing from the software industry, including Microsoft.

Ray Nimmer, the University of Houston law professor who drafted UCITA, says the law was never intended to replace or change existing consumer protection laws. "It follows the open, free-market traditions of the United States," he says.

Of course, states can amend UCITA's provisions. In Maryland, the law bars mass-market software vendors from remotely disabling products.

At this writing, UCITA has been introduced in Delaware and the District of Columbia; it was introduced but killed in Hawaii, Oklahoma, and Illinois, and it is under study in New Jersey. There's still plenty of time for most of us—who don't have the patience or expertise to decipher the fine print in software licenses—to just say no to UCITA through our state legislators.

—Yardena Arar ▶

What's Wrong With UCITA?

THE UNIFORM COMPUTER Information Transactions Act would give the force of law to all the fine print in those software licenses that you find in shrink-wrapped packages and on Web sites. Among other things, UCITA would let a vendor:

- **Disclaim liability for any damages incurred by software it knew to be buggy.**
- **Prevent buyers from selling or giving away any computer software that they no longer intend to use.**
- **Prohibit buyers from using software that came bundled with a PC on other computers, even after erasing it from the original system.**
- **Notify users of a change in the terms of a license (such as fees for online services) simply by posting an announcement on its Web site.**
- **Claim UCITA protection for music CDs, so buyers might not be able to sell or give away a used CD or record it in MP3 format for personal use.**

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Listen Up! Hear E-Mail and Web Information by Phone

T R E N D

THE NEXT time you need a quick bit of information from the Net, you may not need to boot up your PC. With a new type of service called voice portals, you can use a phone and your voice to retrieve up-to-date traffic and weather reports, financial news, stock quotes, restaurant reviews, and other useful morsels. The services may appeal to business travelers and people who already depend heavily on cell phones for convenience.

You have little to lose by trying voice portals, since they are free. (The companies make their money by playing short, unobtrusive ads.) The business idea has promise, says International Data Corporation analyst Dana Thorat, who predicts that the idea will catch on once consumers understand it. Down the line, the voice portal companies want to add shopping functions.

I tested three new voice portal services—Quack.com, Shoutmail, and a prerelease version of Tellme—to see how they measure up. My verdict: The services work—usually. When speech recognition errors intrude (and some of those mistakes can be gross), it's frustrating. Due to the limits of cell phone coverage, your call sometimes ends unexpectedly. And of course, voice portals can't give you the breadth of the Web: Instead of surfing, you're choosing from the bits of data that the companies choose to provide.

QUACK ME UP

QUACK.COM, the easiest to use, provides information in six basic categories: stocks, weather, traffic, sports, movies, and restaurants. Registration at the Web site is simple; you can also sign up for information specific to your locale. For instance, you can get a quick or extended forecast of weather conditions in a particular city where you'll be traveling. When you're on the phone with Quack.com, it expands searches as you answer questions posed by an amiable automated host.

But not everything is just ducky. Today's voice recognition technology gets you only so far. When I tried the traffic feature in and around San Francisco, the automated host had trouble understanding me on several occasions. I kept repeating "101 South," but the system mysteriously interpreted my words as "Portola Drive," a country lane by comparison. Another time, I requested a traffic report for Interstate 280 but the service misunderstood what I said, and then repeatedly failed to recognize a simple "No."

Shoutmail, a worthy competitor, offers more categories of information—even horoscopes and plot summaries of soap operas if you are so inclined. Most people will use its e-mail, weather, and business news capabilities, all configured on a personalized MyShoutmail Web page. Shoutmail is less voice-interactive than Quack.com; instead, you mostly scroll through menus and select information with the phone's keypad. That means you won't be repeating phrases over and over—but it also limits car use (scrolling and driving don't mix well).

DIAL M FOR MAIL

SHOUTMAIL allows you to retrieve messages from your personal or office e-mail account using any phone, including a Web-enabled cell phone. (You can also set up an e-mail account with Shoutmail.) E-mail delivery worked well in my tests. Though the herky-jerky computerized voice that read my e-mail sometimes sounded garbled, I became accustomed to it.

Tellme, the last voice portal I tried, offers the same types of information, plus some unique helpers. For example, simply say an airline's name, and Tellme connects you to its reservation number. This worked flawlessly each time I tried it. Tellme's Phone Booth feature grants you free 2-minute phone calls from your cellular or regular phone. That's a nice money-saver for quick cell phone calls.

I tested a trial version of Tellme; the final version is expected to launch by late July or early August. Overall, it had more trouble with speech recognition than the other portals did. For instance, it took me a few redials to access the restaurant database using voice commands, and when I did access the menu, the software rarely understood my words, or it misinterpreted them altogether. However, keep in mind that its speech recognition may improve with the final version. According to a Tellme representative, future versions will work more simply; they won't require on-site registration or a PIN to connect to the service.

For now, I would recommend Quack's service for its ease of use, or Shoutmail for its e-mail capabilities and wealth of customizable information. But keep your ears open—new services will debut in the next few months.

—Mick Lockey ▶

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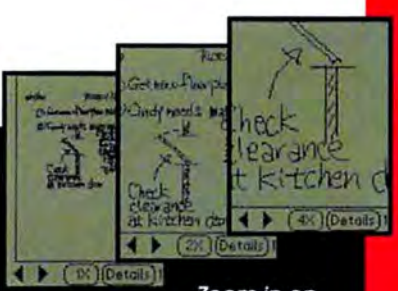

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Trade On: Blue-Chip Brokers Add Wireless Services for PDAs, Pagers, Web Phones

REALITY CHECK

ONLINE BROKERAGE firms make trading stocks on a PC cheap and easy. Now, wireless services make it mobile, too. E-Trade and Charles Schwab (and soon Merrill Lynch as well) are the latest brokers to let you manage accounts via wireless Palm and Windows CE devices, two-way pagers, or Web-enabled phones.

IPO ON A PALM? Fidelity's wireless Web application lets you trade stocks and manage accounts.

STRINGS ATTACHED

BUT MOVING FROM wired to wireless Web investing can be complicated. Your broker may not work with your wireless device or service provider. For example, Fidelity's Instant Broker is on the Sprint PCS Wireless Web menu, while E-Trade is on AT&T PocketNet, GTE Wireless, and Verizon.

Even if your brokerage does not have a Palm application or a slot on the menu of a Web-enabled phone or pager, you may be able to access your account via a minibrowser, but it won't be easy. You typically have to enter the URL on a tiny phone keypad or an even tinier keyboard, or with a stylus. And you can access your account only within the coverage area of your wireless service: Don't expect roaming for wireless Internet access.

I tested the Suretrade service on a Palm VII device and on a Sprint PCS phone. With the Palm VII application, service was easy but slow. Trading was brisk on the Sprint PCS phone but more complicated, because I had to key in Suretrade's URL on the telephone keypad. After that, access was easier and zippier than on the Palm—but my phone's small screen made reading more frustrating.

UNTETHERED TRADING

WHAT CAN YOU do with your wireless Web portfolio? That too depends on your service and broker. Without even opening an account, you typically can get stock quotes and maybe market news. Subscribers can execute trades, or opt to receive alerts when a stock price reaches a given level, a feature that may prove more appealing to mobile investors than the ability to trade.

"I don't think everyone will be making trades from a wireless device," predicts Greg Smith, a senior analyst who specializes in electronic brokerage at Chase H&Q. "A larger group will use the device to access data and receive alerts." This pattern is already visible with PC-based online investors: Many more people use the Web for research than for actual trading, which they typically conduct over the phone or via a traditional broker.

Despite the increase in wireless portfolio services, most people who could use them don't—partly because the wireless services are clunky compared to more traditional wired alternatives, and partly because of security concerns. But those concerns may not be justified, says Pete Rickets, Ameritrade's senior vice president of product development. Rickets says security with a Sprint PCS phone is probably greater than with a desktop browser, because Sprint's PCS network is more secure than the general Internet.

If you're interested in wireless investing now, check with your brokerage to see what services and devices it supports—you may have to change brokerages or services to get the features you want. Despite the confusion over services and platforms, most brokers are betting wireless will be big. "In two to four years, we expect to have as many people interacting from a mobile device as from a PC," says Jim Safka, general manager of E-Trade Everywhere. Maybe someday, like the ad says, we *will* all invest this way.

—*Cameron Crouch* ■

Wireless Trading: Costly at Schwab

BROKER	Activities/platforms	Cost of trades
Ameritrade www.ameritrade.com	Quotes and trades from Palm wireless devices and Sprint PCS Web phones.	$8 ($13 for limit orders)
Charles Schwab www.schwab.com	Quotes, alerts, trades, account information, and news from Palm IIIx and Vx devices (RIM pagers and Web-enabled phones to follow).	$30 and up, plus $55 monthly service fee
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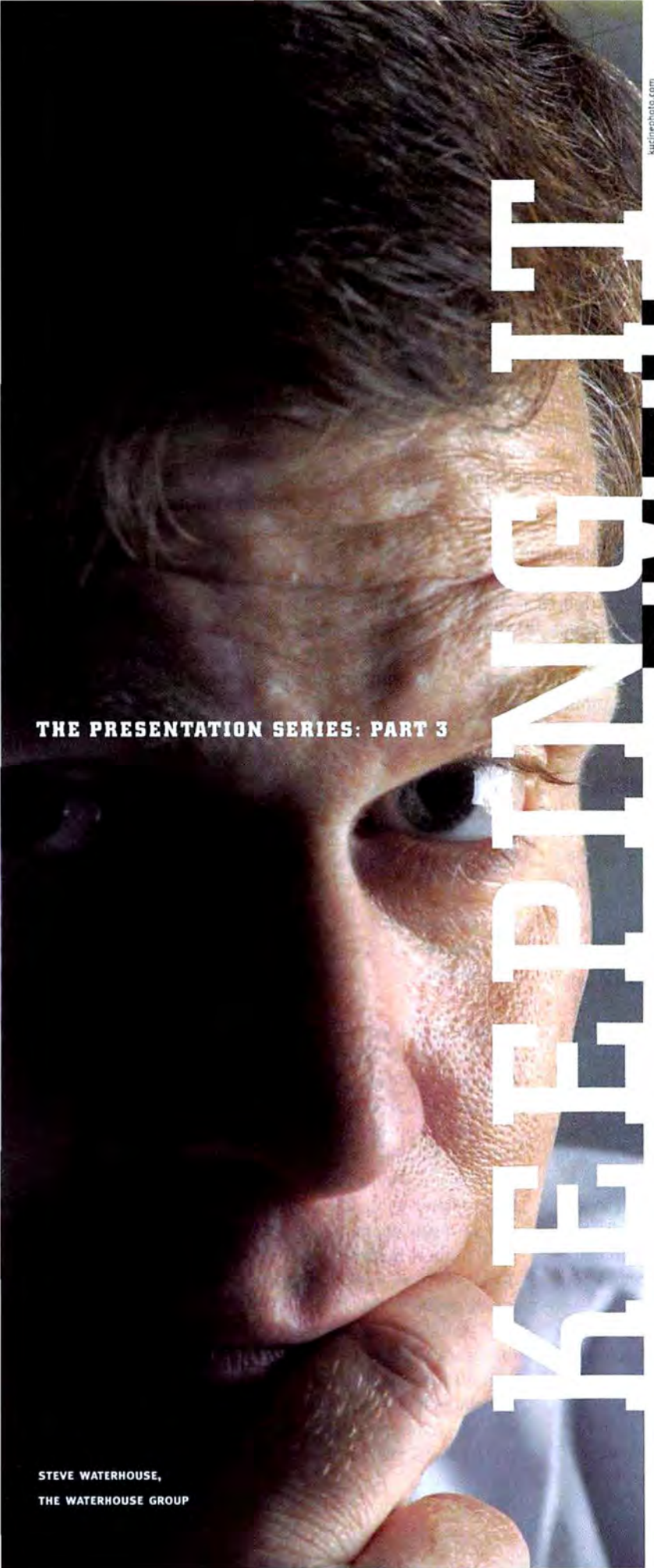

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continued on page 3

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3, 2, 1...Contact!

Recently, Commonwealth Telephone Co., an independent telephone company serving eastern Pennsylvania, tried to re-train 100 of its back-office employees for new responsibilities within its organization. But when the workers dug in their heels against their new roles, Commonwealth brought Waterhouse in to give the group a pep talk.

Waterhouse first asked management to help him find materials that he could use to personalize his message. "I knew it was going to be a challenge, but I had to make instant contact with these people," he says. His search turned up an internal Web page with photographs taken at a recent company picnic. Waterhouse decided to bring a few of the images into a Microsoft PowerPoint presentation.

"It's such a simple and effective thing to do," he says. "I just pasted the images into my PowerPoint slides. So, when I started the presentation, the audience immediately saw themselves as a part of the show."

Waterhouse occasionally interviews audience members before a speech and snaps their pictures with a 35mm camera. He then scans the prints on a Hewlett-Packard multifunction device. Digital cam-

continued on page 5

Prevent Mobile Meltdown with a Microportable Projector

Mobile professionals take a chance each time they move their presentations from one PC or projector to another. "A presentation you created on your office desktop may not perform as well on a laptop or on your client's PC," says Jeanette Cates, Ph.D., whose Austin, Texas-based firm, TechTamers, teaches organizations to use technology more effectively. "You absolutely want to check out the equipment you'll be using in advance."

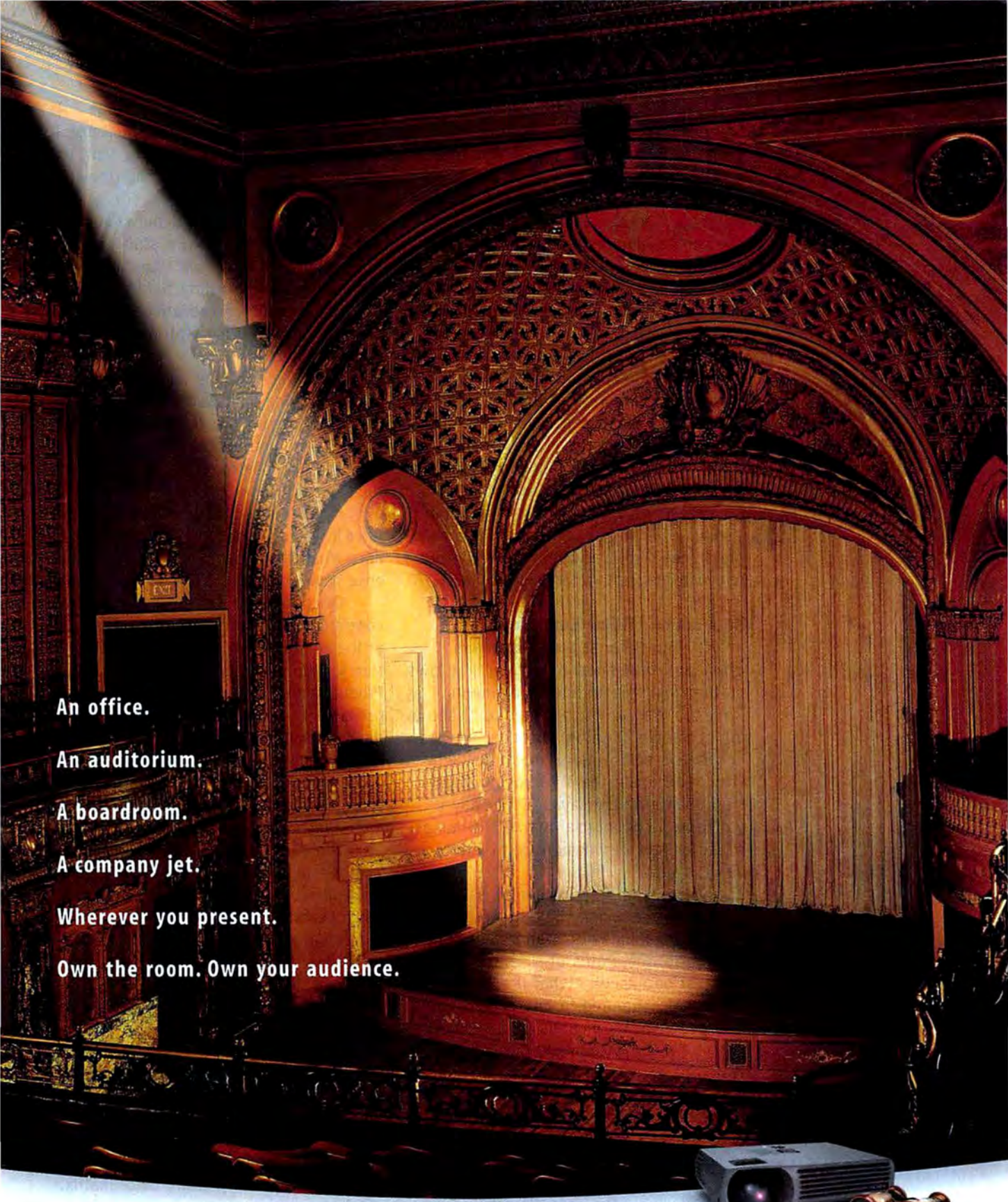
While it helps to bring your own gear to a presentation, few portable devices can compete with the brightness or features offered by their heavyweight desktop counterparts. Now PLUS Corp. president Tom Oishi says that his Allendale, N.J.-based team has developed the technology "to offer mobile professionals a new level of quality performance and value." The PLUS U2-1130 XGA and U2-1100 XGA digital projectors are among the brightest devices under six pounds. The U2-1130, which delivers 1,130 lumens of brightness, is the brightest microportable digital projector in its category. (The U2-1100 comes in at a stellar 1,100 lumens.)

PLUS combined Texas Instruments' DLP technology with its own patented PLUS Optical Engine in both projectors to keep them thin (measuring only 2.3 inches high) and sharp (with an 800:1 full on/off contrast ratio). The DLP technology synchronizes a tiny array of thousands of mirrors with a rapidly rotating color wheel to produce seamless images in millions of shades of color. And the Optical Engine helps to boost the projectors' brightness and light quality still further through its fly-eye lens and advanced compression technology.

THE PLUS U2-1110 (top) AND U2-1130 (bottom)

PLUS appears to be packing as many desktop perks as possible into its microportable projectors. Each U2 projector features a full-function remote control with laser pointer, automatic adjustment setup, x1.2 manual and x4 digital zoom, freeze frame and pic mute, and built-in direct mouse control. The projectors also support digital keystone correction, for a consistent video image in any environment.

And PLUS ensures that its U2 series will survive the rigors of business travel by girding the projectors with magnesium alloy cases and adding quick-release adjustable feet. The U2s also ship with the cables, adapters, batteries, and soft carrying case that mobile professionals rely on for quick-start presentations.



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It's showtime!

THE PRESENTATION SERIES: PART 3

continued from page 3

eras, Waterhouse insists, make it even easier to freshen-up a tired presentation. "[With a digital camera], even if you're not a professional photographer, you can bring up a great-looking picture you took five minutes ago and add it to your presentation," he says.

Digital video and audio also serve to strengthen tenuous ties between speakers and their jaded audiences. Before some talks, Waterhouse uses a Sony CCD-TRV75 camcorder to record interviews with important industry figures. He then digitizes the video and incorporates it into his PowerPoint slides. The technique is a winner with the dot.com crowd, which expects dazzling, high-tech showmanship. "[This audience] wants to see activity on the screen and they want to see relevant images," Waterhouse explains.

THE MITSUBISHI X400 OFFERS 3,000 LUMENS OF BRIGHTNESS AND A FULL SIX-COLOR PALETTE.

Sources and Other Sand Traps

In their quest for sparkle, speakers often run roughshod over copyright laws as they snatch multimedia elements from the Web and other media. "I see a lot of people clipping cartoons, articles, and music out of magazines and Web sites, and using them without permission," Waterhouse says. "Especially if you're in a commercial market, it makes sense to [get permission from] your sources first."

There is another reason to ask for permission, especially before copying photographs, videotape, and sound bites: finding out the status of a source (e.g., living or deceased). "What if something awful had happened to one of the employees in the pictures from Commonwealth's company picnic?" Waterhouse wonders. "If they had been fired, or worse, you can bet [the company] would never call me again."

Speakers may be able to take steps to avoid communication breakdowns, but they can never fully guard against technology failures. Presenters must be ready to carry on without help from their multimedia tools. "Too many presentations die when the projector or laptop dies," says Bob Bailey, president of Silver Spring, Md.-based ebiz, a one-man firm that helps high-tech startups make successful pitches for venture capital. "You want to show the audience that you can do without all this stuff."

Waterhouse once got the chance to show an audience his own stuff at a presentation in New York City: "I was the second speaker standing before several thousand insurance executives," he says. "I hit a button on my laptop and nothing happened."

Soon the AV squad jumped into action, working their way toward the stage. "And that was the last thing I wanted them to do," Waterhouse says. "So I reached over and put the screen down—that was their signal to retreat. I then went on to do a 35-minute presentation without a hitch. After it was over, my host told the audience what had happened, and the audience gave me a standing ovation."

Of course, a projector that performs consistently in any environment should be at the center of any speaker's presentation toolkit. Mitsubishi Presentation Products' new XGA projector, the X400, promises to raise the bar for brightness in desktop portable LCD projectors. Indeed, the 14-pound projector burns brightly at 3,000 lumens, which helps to ensure successful presentations even in poorly lit multi-function presentation rooms.

The X400 also manages 1,024 by 768 XGA resolution with its three 1.3-inch poly-silicon active matrix LCD panels and Micro Lens Array technology. And users can achieve up to 1,280 by 1,024 SXGA resolution through Mitsubishi's seamless compression routine.

Digital video mavens can take advantage of the X400's support for NTSC, PAL, and SECAM video standards. (The X400's digital interface delivers clear, sharp pictures that are free from the interference and noise caused by analog conversion processes.) And the projector uses Mitsubishi Electric's patented ColorView natural color matrix, which acts like a graphic equalizer for color. With ColorView, users can adjust the tint and saturation of colors in a full six-color RGB, CYM palette.

continued on page 7

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Astound

continued from page 5

Packing Light

Electronics heavyweights Sony Electronics Inc. and Proxima Corp. are also working to combine presentation power and portability. Sony's SuperLite series LCD projectors and Proxima's UltraLight models all weigh under eight pounds. Sony's smallest projector, the SuperLite VPL-CS2, measures just 11 by 2.125 by 8.5 inches and weighs 6.4 pounds—less than the travel weight of an A-Series IBM ThinkPad. And its easy-grip handle and detachable strap make the VPL-CS2 a cinch to hang on to while racing through airport terminals.

Sony's SuperLite VPL-CX10 and its close relative, the VPL-CS10, are just as roadworthy. Speakers on the go will appreciate the projectors' compact designs and light weight (each is only seven pounds, 11 ounces). Their retractable carrying handles also make the VPL-CX10 and VPL-CS10 especially appealing for travel.

Proxima, meanwhile, has managed to squeeze features such as a zoom lens and digital keystone correction with on-screen display into its family of three UltraLight projectors. All three devices can boast high brightness and rich color, thanks to Texas Instruments' Digital Light Processing Technology (DLP). The UltraLight DS2 and

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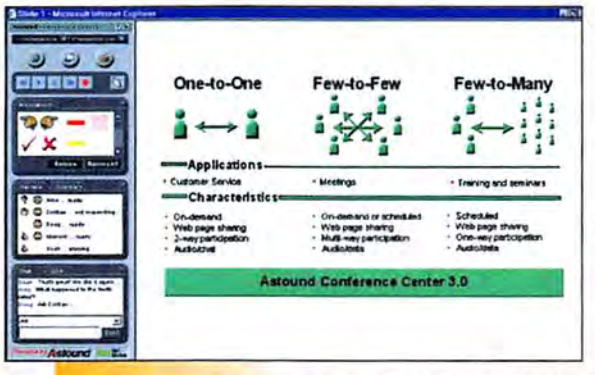
Web Conferences

The Perfect Presentation Follow-up

Steve Waterhouse knows that even his sharpest presentations can lose their edge very quickly: clients who resolve themselves to change soon slip back into old patterns of behavior. So he uses Internet communications technology to make sure that his messages stick. "I will often offer my clients an hour-long Web conference as part of the follow-up package," Waterhouse says. "It's got to be one of the most efficient ways to hold a meeting."

During his initial presentation in front of a live audience, Waterhouse records up to 148 minutes of audio on a Sony MiniDisk recorder. Waterhouse then edits the audio recordings—"down to a few important points"—for inclusion in his follow-up Web conference presentations.



THE ASTOUND CONFERENCE CENTER AT www.astound.com

Waterhouse also adds short video clips of audience reaction shots from the original meeting, but he admits that he uses the option sparingly. "The problem is that many sales organizations are still not using cable modem and DSL. The bandwidth for video streaming isn't quite there yet."

The right Web conferencing solution can make or break a presentation with multimedia elements. The latest version of Astound Conference Center, Version 3.0, from Los Altos, Calif.-based Astound Inc., boasts an extensive Streaming Media Network (SMN) of geographically distributed servers. SMN decreases wait-times by streaming audio and video content over only those servers that are closest to individual audience members.

Conference Center 3.0 (at www.astound.com) also synchronizes audio and video to accommodate variable connection speeds.

"We make sure that, whether they're on a 28.8 modem or on a T1 line, everyone sees and hears the same thing at the same time," says Steven McWilliam, vice president of marketing at Astound.

Conference Center is a completely integrated service that combines real-time conferencing, group collaboration, and on-demand information access. It ensures platform independence with Java applets, Dynamic HTML, and intelligent pre-loading technologies. It is also the only Web conferencing service that tells presenters, in real time, whether their attendees are online.

Astound Conference Center 3.0 generates meeting minutes and creates conference archives for latecomers and absentees. "Not one element of a presentation is missed in the archive," McWilliam says. "Every media clip and audience discussion is saved."

The service has also been expanded recently to include "emoticons," icons participants can use to express emotional responses such as agreement, applause, and—in case there is any doubt—boredom.

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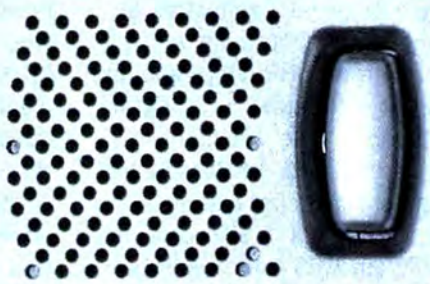

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It's showtime!

THE PRESENTATION SERIES: PART 3

continued from page 7

DX2 come to a wee 8.25 by 10 by 3.2 inches, and each weighs merely 5.2 pounds. The top-of-the-line UltraLight DX3 maintains an especially svelte figure, measuring 9.6 by 7.7 by 2.7 inches, and weighing exactly five pounds.

THE VPL-CX10, ONE OF SONY'S SUPERLITE PROJECTORS

But none of these projectors sacrifices brightness or clarity to achieve its diminutive proportions. Sony's VPL-CX10, which measures 11.25 by 3.63 by 9.88 inches, generates a whopping 1,200 lumens through its UHP lamp, enough to project images in a brightly light room. (The VPL-CS10, which is the same size as the VPL-CX10, puts out an impressive 1,000 lumens.) The VPL-CX10 also provides true XGA resolution with three 0.9-inch LCD panels with Micro Lens Array, on-screen menu control, and digital zoom and digital keystone functions.

Proxima's UltraLight DX3 can compete handily for the title of brightest and lightest projector around. This little five-pound dynamo can belt out 1,100 lumens of brightness, 16.7 million colors, and XGA resolution. And by supporting the Digital Visual Interface standard, the DX3 enhances connections to high-performance PCs.

Content is Still King

As portable projectors become more robust, speakers are learning to take greater advantage of PowerPoint's extensive capabilities. "It's one of the easiest applications to learn and feel confident about," says Jeanette Cates, Ph.D., whose Austin, Texas-based firm, TechTamers, teaches organizations how to use technology more effectively. "Presenters often feel like their technology is driving them, but PowerPoint helps them to regain control."

But PowerPoint can overwhelm speakers who make their graphics too complex. This problem often comes from starting out with the wrong priorities. "The biggest mistake presenters make is that they design their slides in Slide View first," notes Cates. "They really should be getting their content down in Outline View before attempting anything else."

Hi-tech wizards run the greatest risk of getting bogged down in designing slides. "Because PowerPoint is so incredibly powerful, it becomes a double-edged sword," says ebiz's Bailey. "Techies in particular can get easily carried away with all of the animations, transitions, and other effects that are available to them."

Bailey cautions against what professional speakers have labeled "death by PowerPoint": the boredom that sets in when a speaker depends too much on his slides to tell a story. He says that would-be PowerPoint users should check out *High Tech Heretic,* a recent book by tech-culture gadfly Clifford Stoll. In a chapter entitled "The Plague of PowerPoint," Stoll remarks that presentation software is good for little more than creating "a boring slide show, complete with irrelevant whiz-bang graphics."

Speakers can even get distracted by their own slides. "I have seen my clients sit down at the front of a room, looking like they are about to start driving their PC like a car," Bailey laments. "I tell them they should be using their slides as a backup to whatever they're actually saying—not as a script."

PROXIMA'S ULTRALIGHT DX3 PROJECTOR

Too much text can kill a slide presentation altogether. Bailey and Cates encourage their clients to follow the well-known "five by five" rule in PowerPoint presentations: no more than five words per line, and five lines per slide. Bailey also teaches his clients to condense their text into "sight bites—short phrases that can be read in a fraction of a second."

Advanced presentation technologies have raised the bar for speakers in general. Audiences are becoming smarter, but their attention spans are getting shorter. "People have come to expect more than a static slide show," Waterhouse says. "Otherwise, they lose their focus, and you lose their interest."

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THE PRESENTATION SERIES: PART 3

Low-Tech Tips for High-Tech Success

THE HIGH-TECH TOYS you bring to a presentation can make you a star, but they can't substitute for these down-to-earth measures from Jeanette Cates. (You'll find more great ideas at her Web site, www.TechTamers.com.)

Chet Phillips

Be *really* prepared.
Practice unpacking and plugging in your projector and laptop, "at least two or three times," Cates suggests. "You can get really shaken up when your equipment is not ready to go."

Start talking about a slide *before* it appears on screen.
"The typical beginner will look like they're a bit surprised when the slide appears," says Cates. "You should be into your first or second line before it comes on screen, like an over-the-shoulder graphic does in a news broadcast."

If you must surf the Web in front of an audience, do it *offline*.
"Connectivity is always the big 'gotcha,'" says Cates. "Never assume that there is going to be a working phone line in the room where you're making a presentation." Microsoft Internet Explorer users can store pages by checking the "make available offline" option in the browser's Add Favorite dialogue box.

Give your slides a quick facelift with non-Microsoft backgrounds.
"It's so easy to recognize a PowerPoint slide these days," Cates says, "because so many of us use the same backgrounds. We all need to expand our repertoire of visuals." Cates gets excellent results with Powerbacks 2000, a collection of backgrounds from Phoenix, Ariz.-based Blue Worx (at www.powerbacks.com). "The ultimate compliment is when someone asks you, 'What application did you use to create your slides?'"

Tame your space.
Cates always makes a point of rearranging the room she's working in so that everyone has a clear view of her presentation. "Don't be afraid to push some chairs and tables around. If you don't, some of your attendees might see nothing more than a little dot of light at the front of the room."

Avoid running out of outlets.
"I always carry an extra power strip," Cates says, "because the one plug that you find in many hotel conference rooms just won't cut it for multiple devices."

Always keep a mouse in hand.
"I learned, the hard way, that if your hands are a little wet [because you're nervous], you'll get no traction on a touch pad," Cates says. "I had to invite someone to come forward and use the track pad for me. So you'll never catch me without a mouse again."

Put some distance between you and your hardware.
Says Cates: "You don't want to look like you're tied to your computer; it contributes to the impression that the technology is controlling you." (She uses a Varatouch ProPresenter remote control during her presentations.)

Cover your wires.
That rat's nest behind your equipment can put fear into the hearts of technophobes. Cates covers the cables with print scarves (hers bear zebra stripes) to create a tidier—and less intimidating—look.

Cover your behind.
Make two duplicates of your last slide and add them to the end of your presentation. "If you get overexcited and click past the last slide, nobody will know the difference," Cates says.

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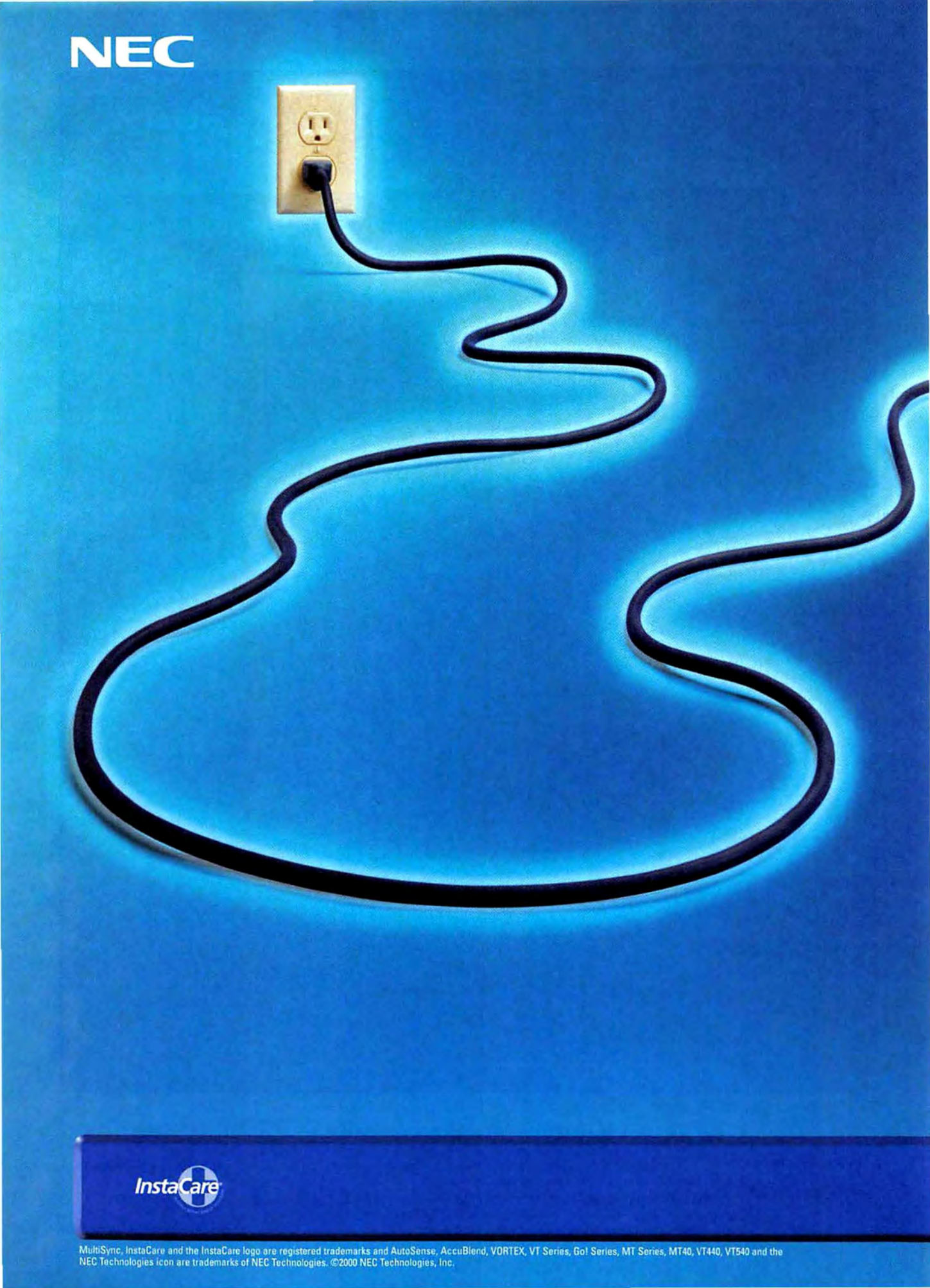

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Road & Conf. Room	8.6	1000 - 1100	MultiSync VT Series
Conf. Room	13 - 16	1300 - 2000	MultiSync MT Series

NEC Technologies

It's showtime!

THE PRESENTATION SERIES: PART 3

First Impressions Last

WHEN COLLEEN AARONSON finally found the answer to the problem that had hampered her sales for two years, the revelation wasn't accompanied by an earth-shaking thunderclap. It was more like the quiet click of a light switch.

Aaronson's problem was a lack of immediacy. As a new business development representative for an electronic appliance wholesaler, Aaronson typically had about two minutes to capture a prospective client's attention during her sales presentations. She needed to show that she had her finger on the pulse of the client's business by personalizing her presentations with up-to-the-minute prices, news affecting the client, and current inventory availability.

NOVATEL'S MERLIN WIRELESS IP-BASED MODEM

However, the limits of the technology she was using kept her from achieving her goal. She'd tried a number of solutions to stay connected to the data she needed: e-mail, dialing in to her company's intranet from hard-to-find walljacks, and calling corporate headquarters. But differences in time zones and the volume of the data she needed made all these methods time-consuming and error-prone.

As in most situations where there's a need for anywhere, anytime access to data, the answer was wireless connectivity. One of Aaronson's customers recommended that she buy a wireless modem to access her company's intranet. Aaronson ultimately bought a modem from San Diego-based Novatel Wireless Inc. The slim 1.5-ounce Merlin, a wireless IP-based modem, slips into her laptop's Type II PC Card slot. Before each meeting, she can connect quickly and easily from any location to download the information she needs to update her on-disk slides. Aside from its real-time, wireless Internet connectivity, the Merlin modem also sends and receives e-mail, and keeps Aaronson connected to her favorite Web sites.

The nature of the information Aaronson uses makes security a priority. Using the Wireless IP network communication channel, with its comprehensive over-the-air encoding and encryption methods, makes it virtually impossible for unauthorized users to capture and decipher sensitive data.

Another lesson Aaronson learned about using technology for maximum impact is to focus on connecting with her customers rather than on connecting her cables. Her projector, the bantamweight NEC Multisync VT440 portable projector, sets up with no hassles. The versatile projector's AutoSense technology reads each incoming image, locks it in, optimizes it, and displays it in just three seconds. Another NEC innovation, Vortex Technology, allows the VT440's brilliant image to shine through ambient room light, enabling speakers to deliver a brilliant, color-rich presentation in any room.

THE NEC MULTISYNC VT440 PORTABLE PROJECTOR

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It's showtime!

THE PRESENTATION SERIES: PART 3

Meetings When and Where You Want Them

THE NEED FOR EFFECTIVE CONNECTIVITY sometimes extends well beyond the walls of conference rooms. For example, an increasing number of meetings are held in virtual meeting rooms where remote team members simultaneously participate in real-time, fully interactive events.

Leveraging the Internet's universality, online meetings can eliminate the barriers to cooperative communication imposed by time and distance. They can also help compensate for the inherent limitations of telephone calls, e-mail, and faxes. To reap the benefits of online meetings, all participants need is a browser, a telephone, and an ISP.

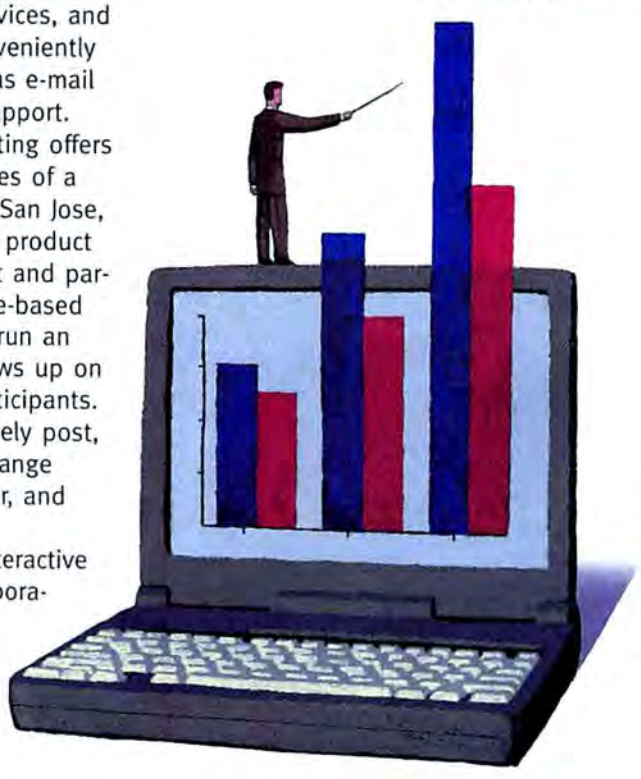
A New Twist on an Old Idea

These modern-day versions of yesteryear's bulletin-board systems offer many advantages inside and outside the company doors. Online meetings can help remote employees stay current and contribute their expertise to help their companies and colleagues make better decisions. For co-workers and external partners, a virtual meeting space on the Web can result in reduced costs, fewer mistakes, and increased sales. For the company's customers, this technology can provide access to products, services, and assistance faster and more conveniently than traditional methods such as e-mail and waiting on hold for tech support.

Sitting in on a virtual meeting offers many of the real-time advantages of a physical meeting. For example, San Jose, Calif.-based WebEx Inc. offers a product which enables the meeting host and participants to deliver or view slide-based presentations remotely, and to run an application on one PC that shows up on the screens of all the other participants. Participants can also cooperatively post, view, and edit documents, exchange chat messages with one another, and surf the Web collaboratively.

WebEx's product, WebEx Interactive Services, creates a secure, collaborative shared workspace on the Web, or on an intranet, where participants can collectively transform data into knowledge. WebEx's Interactive Services are entirely hosted and maintained by WebEx at their globally distributed hubs. Therefore, customers needn't incur the costs of additional hardware or software installation in order to use the service. Centralized hosting makes WebEx particularly well-suited to improve communication within ad-hoc teams whose members don't usually work together, such as project consultants, business partners, or contract employees. Although remotely hosted, a WebEx Meeting Center can be custom-branded and configured to adhere to a company's appearance. Another feature, WebEx's Presentation Sharing, enables any meeting participant to spontaneously share a presentation with other participants without uploading the entire file to a server, where the security of the file might be compromised.

continued on page 19



Jonathan Evans

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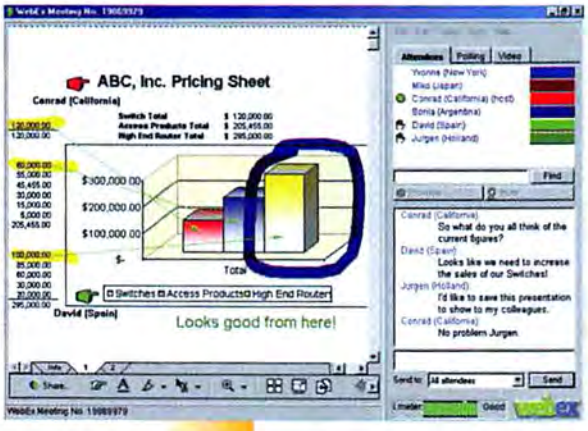
It's showtime!

THE PRESENTATION SERIES: PART 3

continued from page 17

In addition to aiding decision support and knowledge transfer, online meeting rooms can enhance product sales through real-time demonstrations of features and benefits and through problem resolution. For example, some software companies use the interactive presentation features of an online meeting service to "walk" customers through fixes and to provide short training sessions in using their software.



WEBEX INTERACTIVE SERVICES CREATES A SECURE, COLLABORATIVE ONLINE MEETING SPACE.

Custom-Built to Meet Your Needs

Online meetings can range from large-scale sales seminars, to small group brainstorming meetings, to classroom-style corporate training delivered on an intranet. All these events typically include presentations and other multimedia information exchanges, including voice, that allow businesses to remain agile and to transfer knowledge quickly across the value chain in real time, regardless of geographic distances and time zones.

The impressive array of time- and money-saving features of online meeting technology has not escaped the notice of savvy businesses. According to research done by San Francisco-based Collaborative Strategies LLC, the market for real-time collaboration (RTC) products and services in 1999 was worth $6.2 billion. They predict that in 2000, the RTC market will reach nearly $8 billion.

As Intel's Andy Grove once noted, "In this new Internet economy, there are only two types of companies—the quick or the dead." That's because now, more than at any time in the history of business, exchanging ideas and knowledge is as important as exchanging physical objects. Survival in the new Internet economy demands an agility that is gained by combining market savvy and superlative customer service. If your company's mainstay is manufacturing physical products, then the well-oiled machines that make those goods are vital to your survival. When ideas and services are your chief stock-in-trade, then the people who work together to generate the ideas are your most valuable asset. Helping to bring those people together more effectively can only quicken the pace of your growth. ✧

The Best of Both Worlds

Whether you are travelling on the road or just down the hall, you have to park your projector somewhere to make a presentation. Jeanette Cates recommends placing it off to one side of the room. "That way," she says, "you'll be less likely to cross in front of the image if you're standing on the other side."

THE INFOCUS LP350 AND LP340 PROJECTORS

Both InFocus Systems Inc. and Eastman Kodak Co. have new projectors you can fit into any corner of a conference room. Kodak's V600 Zoom Digital Projector, which measures 3.6 by 10.8 by 12.8 inches, weighs only 7.6 pounds. InFocus' LP350 measures 3.9 by 10.9 by 11.2 inches, and weighs a lean 6.7 pounds.

The LP350's CableWizard technology makes ceiling-mounting and wiring the projector easy and intuitive. And its true XGA resolution and intense 1,300 lumens of brightness mean the LP350 (and the similar LP340) are a good choice for permanent, reliable setups.

Kodak's V600 Zoom is also perfect on the road or at the office. It's an SVGA projector that performs like an XGA, and lights up any screen with 1,000 lumens of color and a zoom factor of 1.3. (Kodak also offers a non-zoom V600.) Kodak has simplified the setup and user menu for the V600 Zoom—an appropriate homage to Kodak's famous slogan, "You push the button; we do the rest."

KODAK'S V600 DIGITAL PROJECTOR WITH OPTIONAL ZOOM

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great minds meet online at webex.com

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NEW PRODUCTS

Colorful Multitasking to Jazz Up Your Small Office

MFDs YOU MULTITASK every day. Why shouldn't your office equipment? New color multifunction devices from HP and Xerox—machines that print, fax, copy, and scan—can help your office pick up its pace.

These two products, each built around a color ink jet printer and color scanner, bring something new to the table, albeit with a wide price spread. The $800 **HP OfficeJet G85** can be shared on an office network (if you add a $145 optional interface), and it supports color faxing. The $350 **Xerox WorkCentre 490cx** makes color copies even when your PC is not operating (other inexpensive color MFDs make color copies by first scanning to disk and then sending the scan back to the printer—an inconvenient process).

Why so much more for the HP? For starters, the OfficeJet has a flatbed scanner glass and an automatic document feeder, while the WorkCentre has just a feeder. The OfficeJet is a bit bulky, but you can scan objects—for copying, faxing, or saving to disk—that simply won't fit through the device's document feeder.

Also, the HP captures better scans, which produce fabulous copies with rich, solid colors and excellent detail. The Xerox's color copies look faded and dull in comparison—they're certainly good enough for office use, but unattractive for important presentations.

But our shipping units produced impressive ink jet print output, even on plain paper.

THE FAX ARE IN

AN MFD sometimes demands intuition, luck, and patience. The WorkCentre's control panel provides little guidance on basic operations, despite a two-line, 16-character LCD. The OfficeJet's control panel is better, with separate, clearly labeled buttons for almost all functions, and its two-line, 16-character LCD makes sense.

Both units offer standard fax capabilities: delayed send, to take advantage of off-peak phone rates; polling, to call another fax machine and request a document; and fax forwarding. Both can route voice calls to your telephone and receive faxes into memory if printer supplies run out.

ABUNDANT SOFTWARE

HP AND XEROX compete brutally in the document processing market, so each provides a wealth of software. The OfficeJet includes IRIS for optical character recognition (which makes scanned text editable) and a graphics editor to capture and clean up scans. Xerox includes LaserFAX Lite plus its own Pagis Pro document-archiving and OCR package.

Unfortunately, with fax, ad-

PHOTOGRAPH: MARC SIMON

VERSATILE WORKHORSES for any budget: the Xerox WorkCentre 490cx (left) and the HP OfficeJet G85.

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Hewlett-Packard OfficeJet G85

PRO: Excellent scanner with flatbed and document feeder.
CON: Bulky presence.
VALUE: High quality, high cost.
Street price: $800
Hewlett-Packard
800/752-0900
www.hp.com/go/all-in-one

Xerox WorkCentre 490cx

PRO: Very good print quality.
CON: Mediocre copy quality; has a puzzling control panel.
VALUE: All you need for the basics in faxing and color printing.
Street price: $350
Xerox
800/832-6979
www.xerox.com

dress book, document management, OCR, and image editing functions scattered over several applications, processing documents on either of these machines takes more effort than it should.

The HP OfficeJet, with its flatbed scanner, support for color faxing, and $79 duplexer option, offers more versatility for running a small business or home office.

If your work requires high-quality color scans and copies, the HP OfficeJet may be worth the extra money. But if good basic color printing and fax capabilities are enough to keep your office humming, the Xerox WorkCentre has everything you need.

—Dan Littman

Talk Fast: New Speech Recognition Software

SPEECH RECOGNITION

TO DATE, though voice recognition software has been a godsend to many disabled users and for specialized applications, most home and business users have found it to be an acquired taste. Lernout & Hauspie's **Voice Xpress Professional Version 5**, however, shows how rapidly the technology is improving. The newest version of this popular program sets up faster than ever, works more accurately, and is easier to use.

I tested a prerelease version tuned for use with Microsoft Office 2000. (Versions for Windows 97 and 98 are available, too; all three use the same core speech recognition technology, and all come with a Plantronics headset.)

The company claims that you can be up and running in about 15 minutes. Based on my trial, that's accurate. The most time-consuming part of the process involves reading a 5-minute voice training script.

I definitely noticed fewer mistakes than with previous versions I've used. As with all speech programs, the more you use Voice Xpress, the more precisely it attunes itself to your voice and vocabulary. The manufacturer claims an overall recognition accuracy level of about 96 percent.

One useful new feature is a filter to automatically eliminate "ums" and "ahs" that clutter dictation. L&H has also done an excellent job of matching Voice Xpress to Office 2000. I particularly liked the context-sensitive help bar, which offers hints about specific voice commands that can be used with an open application. This update supports e-mail, Internet browsing, and chat, too. You can navigate Web links by speaking numbers (called SayLinks) embedded in hyperlinks.

Though L&H claims Voice Xpress will work with any Pentium II system (128MB of RAM is recommended), I found that performance was sluggish on a PII-333 with 128MB of RAM. On a PIII-600 system with the same amount of main memory, however, I enjoyed virtually instantaneous recognition.

—Stan Miastkowski ▶

WHAT CAN I SAY? Voice Xpress Professional's context-sensitive hint bar identifies the voice commands available for the application in use.

L&H Voice Xpress Professional Version 5

PRO: New version sets up fast, has good accuracy, and is easy to use.
CON: Must use for several weeks to enjoy maximum accuracy; sluggish performance on some systems.
VALUE: Pricey, but can make work with Office 2000 more productive.
List price: $150 (Advanced $80, Standard $50)
Lernout & Hauspie
888/537-6688
www.lhsl.com

online

FOR MORE PRODUCT news and the latest announcements, check the offerings of the PC World Daily News Service at www.pcworld.com/news.

Video Editing: Go Hollywood at Home

DESKTOP

HAVE BLOCKBUSTER dreams but saddled with a B-movie budget? Sony's new **VAIO PCV-J100** can help. Sony aims this $1130 desktop PC squarely at Apple's iMac DV. Both claim to provide easy, inexpensive digital video editing. The VAIO costs $170 less than the iMac, however, and offers beefier components.

I tested a shipping unit that was configured with an Intel Celeron-600 CPU, 64MB of RAM, a 15GB hard drive, a modem, a network card, and a 4X/8X/32X CD-RW drive (Sony now bundles the unit with a 4X/4X/24X drive). Sony parks the standard beige CD-RW drive behind a spring-loaded panel, rather than making its tray flush with the case—that's high style, but fragile design. The system's 15-inch flat-screen Trinitron monitor displays sharp text and elegant colors.

THE PCV-J100's beefy components are a good value.

The VAIO's integrated Intel 810 chip set doesn't supply any graphics card memory; instead, it siphons memory from main system RAM, leaving less available for intensive video applications. Buying an additional 64MB of system RAM may allow some breathing room. Fortunately, one of the PCI cards carries IEEE 1394 (aka FireWire) ports, which let you connect a digital video camera that bypasses the graphics system altogether.

Sony bundles its own video editing software, including a new application, MovieShaker, which lets you combine video footage and sounds and then add transitions and special effects to create a finished movie. MovieShaker doesn't provide many editing options, however, and it can't capture video from a camcorder—for that chore, you must use one of Sony's five bundled applications instead.

Still, the VAIO hardware is a good value for the money. Investing in better video software would give you an even better package.

—Alan Stafford

VAIO PCV-J100

PRO: Good value for the money, small but sharp monitor.

CON: Five nonintegrated video apps can make work confusing.

VALUE: Brings video editing to the masses.

Street price: $1130

Sony Electronics

888/315-7669

www.sony.com/pc

Laser Printer at an Ink Jet Price

PRINTER

THE COMPACT Minolta-QMS **PagePro 1100L** delivers satisfactory laser printing for just $249. It's one of the first printers for small businesses Minolta has released since buying competitor QMS.

While the monochrome 1100L isn't supersonic, a shipping unit generated a decent 8.6 pages of text a minute in *PC World* lab tests. Other advantages as an ink jet alternative: It delivers completed pages face down (in printed order), its laser-processed images are less subject to smearing, and it is smaller than most laser printers, at 10 by 14 by 9 inches. Another plus: Like most laser printers, the 1100L is relatively quiet.

THE PAGEPRO 1100L offers you a quiet, affordable alternative to an ink jet printer.

The PagePro 1100L hardly measures up to laser printers aimed at large-office use. It has a nonexpandable 4MB of RAM, it requires Windows, it holds only 150 sheets of paper without the optional add-on paper tray, and it's not designed to pump out large volumes of printed material continuously. When outputting gray-scale graphics, the printer slowed to 4.7 ppm. I also was surprised to discover that the PagePro uses an ECP parallel interface, rather than the faster USB connector that's rapidly becoming standard for peripherals. (Minolta's more versatile, networked PagePro 1100 costs $349.)

Still, the PagePro 1100L is worth considering, especially when budget is a factor.

—Alan S. Kay ▶

PagePro 1100L

PRO: Fairly sharp prints, decent speed, small footprint.

CON: Monochrome only, Windows only, parallel port only.

VALUE: Affordable price.

List price: $249

Minolta-QMS

800/523-2696

www.qms.com/usa

TEST PC WORLD CENTER THIS PRODUCT has been evaluated using tests designed by the PC World Test Center.

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Beauty and Brawn in a Stylish Laptop

NOTEBOOK

WANT A notebook that complements your business suits while satisfying your power needs? HP's **OmniBook 6000** comes resplendent in a sleek new silver-purple case with a handy grip, and includes an easy-on-the-eyes 14.1-inch screen. In addition, Intel's Pentium III-600/500 SpeedStep CPU provides this beauty with plenty of muscle.

Running Windows 2000 Professional, the $2399 OmniBook 6000 earned a score of 129 on our PC WorldBench 2000 tests—marking it as a strong performer for its processor class. Its battery life impressed us, too: The unit lasted 3.5 hours in our tests. If you need more work time, you can pop in a second battery; the notebook conveniently shows full-power/charging LEDs for both. You may want to supplement the system's standard 64MB of RAM, however, to give Win 2K and yourself more room to work.

Replacing HP's OmniBook 4150, this new model offers travelers both a built-in modem and an ethernet port. Our shipping unit came with a 5.7GB hard disk—adequate for most needs—plus standard floppy and CD-ROM drive modules for the media bay. You can easily hot-swap both modules—though the system may balk if you remove one without using the utility that verifies "module off." DVD-ROM, CD-RW, Zip, LS-120, and second hard drive modules are also available. The OmniBook 6000, which weighs 6.8 pounds, comes with a three-year warranty.

The notebook's pointing stick and touchpad, which you can use simultaneously, are responsive, but the keyboard feels cramped, especially for a full-size notebook. The unit offers convenient volume and mute controls on the side, plus a functional resume/suspend button. HP offers an optional $99 Smart Card and reader for extra security.

Business travelers should be very satisfied with this notebook's power and battery life, as well as with its looks.

—Anush Yegyazarian

OmniBook 6000

PRO: It's powerful and sleek, and has good battery life.

CON: Keyboard a bit cramped, could use more RAM.

VALUE: Good choice for mainstream business use.

Street price: $2399

Hewlett-Packard

800/462-8947

www.hp.com/omnibook

TEST PC WORLD CENTER THIS PRODUCT has been evaluated using tests designed by the PC World Test Center.

Get a Grip on Disorganized PC Data

UTILITY

A NEW FREE utility from Enfish called **Onespace** can help you impose order on your PC's data chaos. It manages both locally stored information and Internet data through one centralized interface. In many ways, this utility replaces the Windows desktop.

The more you use Onespace, the more it "learns" what computer functions are important to you. Intel's Automatic Organizer Software is one of the key technologies used. Enfish says this analyzes your data and the way you work and determines what system features are most relevant to you. Onespace's highly customizable interface looks a lot like a Web browser, and shows both Internet data and links to your information.

After installation, Enfish creates an initial index of all your data, a process that took me about an hour. I found the local indexing/searching capabilities very useful. When instructed to search "phone line networks," for example, Onespace gave me a list of all related e-mail messages, documents, and spreadsheet files, all instantly accessible.

ALL TOGETHER NOW: Enfish's Onespace utility integrates data from both inside and outside your personal computer.

I tested Onespace on a PC packed with over 200MB of e-mail messages and several GB of miscellaneous data files. The utility works with Windows 9*x*, NT, and 2000, and it is compatible with most popular applications.

Overall, the utility improves your system's orderliness and makes data easy to access. Onespace is supported by Enfish's partners, with no banner ads on the interface. One caution: Don't expect instant results. Setting up a custom page took me about 45 minutes, and most people will need to use the software for about a week to master the ins and outs of the program.

—Stan Miastkowski ▶

Enfish Onespace

PRO: Highly effective at ferreting out and integrating related data lurking in your hard drive.

CON: Takes some time and effort to set up and learn to use.

VALUE: The price is right.

Free

Enfish Technology

626/660-2300

www.enfish.com

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007-Style Cameras Not Quite a Ten

PDA ACCESSORIES

"BOND. JAMES BOND." That's what I wanted to announce every time I attached one of two new snap-on digital cameras for handheld PDAs. Block Products' gadgety $149 **Eyemodule** is designed for use with the Handspring Visor. Kodak's $179 **PalmPix Camera** is intended for various Palm PDAs. Both are slightly larger than a matchbox and about as light. The Eyemodule takes either black-and-white or color photographs, while the PalmPix snaps only color pictures. Both cameras let you use the PDA screen to preview the picture before capturing it.

EYEMODULE TURNS Handspring into a camera that produces images of very modest quality.

Alas, my Bond fantasy lasted only until I saw the blurry, sometimes pixelated photos the shipping versions produced (not that I really expected great images from such small cameras). The photos may not make memorable family snapshots or vacation souvenirs, but they can be useful to document, say, conference room board notes or trade show exhibits.

Both cameras are a snap to use. The Eyemodule slides into the expansion module bay on the back of the Visor. After installing its application, you view a live-action preview on the screen and press the button next to the fixed-focus lens. You can capture pictures in any of three formats: 320 by 240 pixels in color or black and white, or 160 by 120 pixels in black and white. A Visor Deluxe PDA with 5MB of free memory can accommodate 500 black-and-white shots at 160 by 120 pixels or 125 black-and-white images at 320 by 240 pixels. Alternatively, it can hold 25 color images.

Unfortunately, images at the lower resolution evoke work by pointillist painter Georges Seurat on a bad day. Higher-resolution color pictures can't be viewed in color until transferred to a PC.

Kodak's PalmPix snaps into the serial port on Palm III and VII series devices and attaches to Palm Vs with an optional Dock V adapter. Thanks to its 640 by 480 resolution, 24-bit color, and 2X zoom capability, it produces somewhat better images than the Eyemodule. The camera can also function at 320 by 240 resolution.

The Palm's Date Book button serves as the shutter snap: Press it once to view, and a second time to shoot. You can preview your pictures in color on the Palm IIIc or as gray-scale images on other models. The scroll-up button controls the 2X digital zoom, which works only in the 640 by 480 mode.

The camera supports automatic exposure shutter speeds that range from 1/15th of a second (useful in low light) to 1/500th of a second (good for stopping action in bright light). You can store one picture for each 100KB of memory on the Palm. As with images on the Visor's screen, the preview on the Palm screen is limited by the PDA's low resolution; as a result, what you see is an unflattering approximation of what you'll get on a PC screen or printout. On a Palm IIIc, the preview appears in (somewhat splotchy) color, and the lens is awkwardly located.

KODAK'S PALMPIX takes pictures at 640 by 480 resolution and has a 2X digital zoom capability.

These small cameras might evoke visions of James Bond, but their poor output quality is more reminiscent of the bumbling Maxwell Smart.

—Michael S. Lasky ▶

Eyemodule

PRO: Easy-to-use add-on module for Handspring Visor is useful for creating reference images.

CON: Low-resolution screen and fuzzy output hurt image quality.

VALUE: Convenient if you don't mind low-quality digital images.

List price: $149

Block Products

650/322-1776

www.eyemodule.com

PalmPix Camera

PRO: Easy to use, fair resolution, portable size.

CON: Awkward lens placement, previews are limited by Palm's low screen resolution.

VALUE: Camera's convenience outweighed by blurry output.

List price: $179

Kodak

800/235-6325

www.kodak.com/go/palmpix

QUICK TAKES

Sun Shines Up StarOffice

LOOK FOR AN upgrade of Sun Microsystems' StarOffice this summer. The software suite, Sun's alternative to Microsoft Office, is free and supports Windows 9*x* and 2000, OS/2, Linux, and Sun's Solaris Operating Environment (both SPARC and Intel platforms). StarOffice has modules for word processing, spreadsheets, presentations, drawing, graphics, scheduling, database functions, e-mail, and more. The new version, 5.2, is expected to have better file-format compatibility with Microsoft applications, among other improvements. Sun Microsystems; 800/872-4786; www.sun.com/products/staroffice.

—Anne B. McDonald

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Customized Web Sites in About an Hour

WEB SITE BUILDERS

THE MAKERS OF both **DotCool Builder 2** software ($30) and **OhGolly.com**, a free Web site for small businesses, stress the ease of use of their respective Web page builders. To judge from their promotional material, you could load their software, seat a monkey at the keyboard, and watch him post a "Why I Love Bananas" home page within minutes.

For some time, sites such as Homestead have enabled people who lack a working knowledge of HTML to create their own business or personal Web sites. Now, DotCool Builder 2 and OhGolly.com have taken the next step: You can set up a Web site if you're able to follow simple directions.

Both products reduce Web design to a few well-explained steps and convenient templates. And both companies will host your Web site for free (DotCool for one year only).

Depending on how much material you want to post, DotCool's talking tutorial can guide you through building your site in less than an hour. The 75MB program includes templates for sites about family, hobbies, sports, business, and other subjects. It's simple to insert your own art, graphics, and text. The finished product? Well, when you tell friends you did it yourself, they won't be surprised. The color choices tend to be garish, and the default graphics resemble low-rent clip art.

OhGolly.com enables you to assemble a much more refined look. Its templates are intended for business sites, though they can serve other purposes. OhGolly.com will host a ten-page Web site, plus a catalog featuring up to a hundred products. If banner ads bother you, however, beware—they'll be on your site.

OHGOLLY.COM PROVIDES design templates and sample text for hundreds of types of businesses.

And as with DotCool, the company name will be part of your domain name (like EdWare.OhGolly.com)—though that suffix may not project the image you want it to.

The primary difference between OhGolly.com and DotCool is how your finished site will look. OhGolly's templates are more sophisticated, and the site limits your design choices to prevent novices from spoiling that polished appearance. For beginning Web designers, OhGolly is my first choice. Use DotCool if you can't get OhGolly's templates to suit your purpose.

—Edward N. Albro

DotCool Builder 2

PRO: Talking tutorial makes Web design easy and quick.

CON: Won't win any design awards.

VALUE: Good for beginners.

Price: $30

DotCool

941/498-3558

www.dotcool.com

OhGolly.com

PRO: Makes Web design simple and provides a polished look.

CON: Banner ads on your site.

VALUE: Businesses can easily construct a good-looking site.

Free

OhGolly.com

888/644-6559

www.ohgolly.com

Great View, Price: Dell's 15-Inch LCD Monitor

LCD MONITOR

DELL'S LATEST 15-inch LCD monitor, the **1501FP**, delivers amazingly vibrant and deep colors on Web pages, and crisp, easily readable text in word processing documents. And images stay sharp even when viewed at an angle—a rare feat for an LCD. At $999, the 1501FP isn't the cheapest 15-inch flat panel on the market (IBM's T54A costs $979), but it's close. The shipping version I evaluated has both analog and DVI ports, unusual versatility at its price. At a depth of just 7.1 inches, including the base, this monitor is ideal for cramped spaces.

THE 1501FP PROVIDES first-rate image quality for a reasonable price.

Setup is another story. Cable connection is particularly inconvenient; to access ports, you must pop out a firmly embedded back cover. Though the 1501FP pivots quite easily, it lacks a CRT's sturdiness. It shook a bit when I tried to type quickly.

While other LCD manufacturers encase their monitors in trendy silver or black, Dell chose plain beige plastic. So if you want to add style to your desk, the 1501FP may not be the best choice. But its competitive price, small footprint, and great image quality make it a fine choice for business or home users.

–Kalpana Narayanamurthi ▶

Dell 1501FP

PRO: Beautiful colors, sharp text.

CON: Inconvenient setup, low on design flair.

VALUE: Affordable, high-quality flat-panel monitor.

Street price: $999

Dell Computer

800/388-8542

www.dell.com

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Turn your PC into a digital jukebox

The MP3 revolution has changed the way we listen to and enjoy music. To experience superior sound quality when listening to MP3s or any other music format, equip your computer with the right solutions.

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NEC's MobilePro 780: Slim and Portable

MINI NOTEBOOK

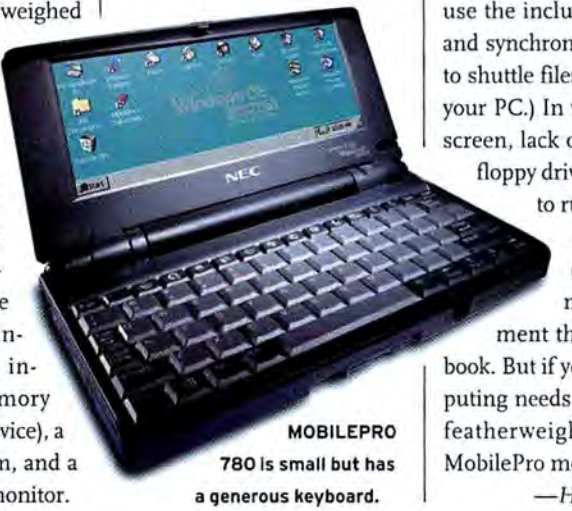
ONCE AGAIN, I'm squeezed into a coach seat on a cross-country flight. But while fellow business travelers grapple with huge, battery-draining notebooks, I type quietly away on NEC's **MobilePro 780**, a Windows CE–based device that's more portable than my nearby copy of *GQ*. I'm happy, I'm productive, and the MobilePro's 8-hour battery life gives me enough juice to compute from coast to coast.

NEC MobilePro 780

PRO: Small; light; reasonable price.
CON: Half-size screen, stripped-down apps, Windows CE limitations.
VALUE: Good portable extension of your desktop PC.
Street price: $799
NEC Computers
888/632-8701
www.nec-computers.com

Closed, the $799 MobilePro is smaller than a rolled-up newspaper. The shipping unit I evaluated measured 9.6 by 5.2 by 1.1 inches and weighed just 1.7 pounds. Yet it's not a palmtop: The unit's keyboard is wide enough for comfortable typing, and the 640 by 240 color display—while only half of VGA resolution—won't make you squint. The standard configuration includes 32MB of memory (generous for a CE device), a 56-kbps V.90 modem, and a port for an external monitor.

Like earlier MobilePros, the 780 provides a stylus, not a mouse; this model also has a thumbwheel for document scrolling. The business-oriented software bundle contains utilities for remote access and networking, plus fax and backup tools. You also get Windows CE's standard productivity software, which consists of scaled-down versions of Word, Excel, Outlook, Internet Explorer, and PowerPoint.



MOBILEPRO 780 is small but has a generous keyboard.

Like any other CE machine, the MobilePro can't serve as a primary computer. (Instead, use the included serial cable and synchronization software to shuttle files between it and your PC.) In view of its small screen, lack of CD-ROM and floppy drives, and inability to run desktop Windows apps, this device is less a notebook replacement than an antinotebook. But if your mobile computing needs are modest, the featherweight, inexpensive MobilePro merits a look.

—Harry McCracken

Casio's Pocket PC Media Center

PDA

WANT A PERSONAL digital assistant that doubles as an entertainment center? Casio's latest Windows CE palmtop, the **Cassiopeia E-115** Pocket PC, looks identical to its predecessors in the E-100 line, and has much of the same multimedia spin. You can run videos on its glorious 65,536-color active-matrix touch screen. Music sounds decent over the built-in speaker and even nicer if you listen with stereo headphones. (A coupon included with the unit lets you send for a basic headset and three extra styluses for about $6.)

Unlike its predecessors, the E-115 runs on the latest version of Microsoft's Windows CE operating system for handhelds; it has the friendliest CE user interface yet, as well as a Reader application to handle electronic books. You get a generous 32MB of RAM and Casio's software for playing (fairly short) videos that you've converted to a proprietary file format via an included desktop program. To entice Palm users to jump ship, Casio includes Harmony Enterprise 99 (for transferring data from a Palm to a Windows CE device) in the software bundle. An optional $299 camera plugs into the Compact Flash port.

CASIO POCKET PC has a great screen, plays music and videos.

At $599, the E-115 costs almost the same as HP's Jornada 548, the only comparably equipped (except for a humbler 4096-color display) Pocket PC. However, I preferred the Jornada's sleeker charcoal-gray plastic case, with its flip-up cover, to the boxy metallic look of a shipping E-115. I also liked the Jornada's USB sync cradle (Casio provides a slower serial hookup). Unless you're dying to play videos or listen to stereo music on your palmtop, the Jornada is the ticket for Pocket PC enthusiasts.

If you need a basic address book, a calendar, memos, and to-do lists in a color palmtop, the sensible choice remains the Palm IIIc, with a 256-color display, for a mere $449.

—Yardena Arar ▶

Cassiopeia E-115

PRO: Pocket PC doubles as video and stereo player; great display.
CON: No USB hookup; expensive.
VALUE: Buy only if you want to play videos on a Windows CE palmtop.
List price: $599
Casio
800/962-2746
www.casio.com

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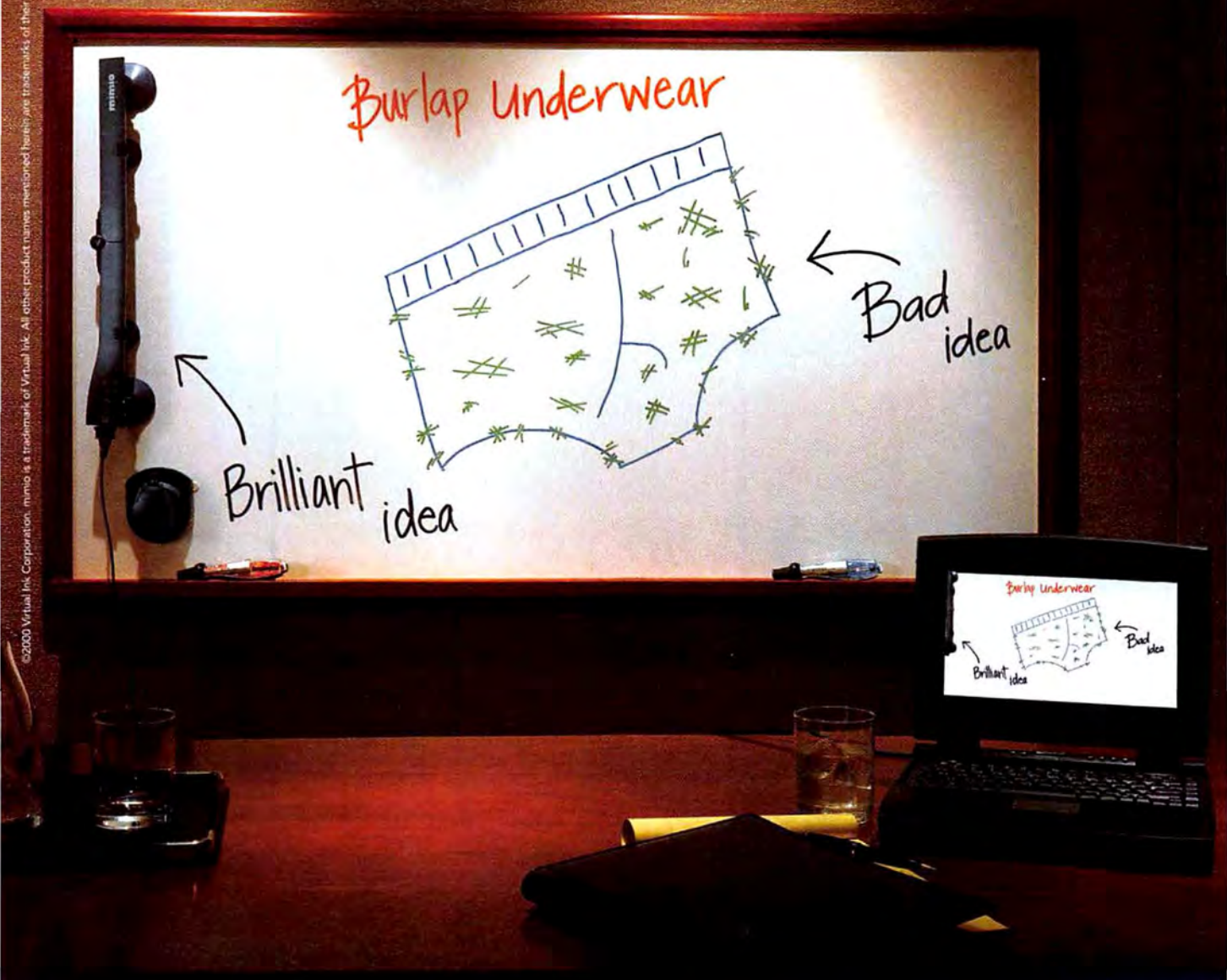

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180° FROM AOL.

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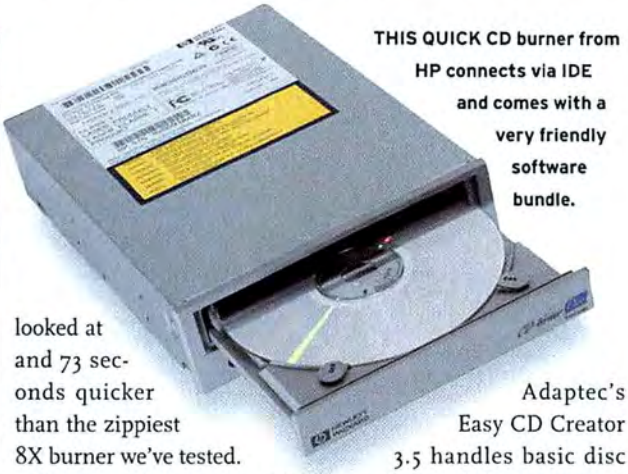
HP's IDE CD-RW Drive Joins the Jet Set

CD-RW DRIVE

UNTIL RECENTLY, burning CDs at rates faster than 8X meant dressing for a SCSI affair. Well, drives that write CD-Rs at 12X may still be a SCSI-only party; but now, thanks to HP's 10X/4X/32X **CD-Writer Plus 9310i**, IDE users can enjoy high-speed times. The product costs $299, about $50 less than a 12X drive.

A shipping unit performed exceptionally well in our tests, with surprisingly fast CD-R write speeds. The drive wrote a 430MB test image to disc in 5 minutes and 51 seconds. That's 57 seconds slower than the speediest 12X writer the PC World Test Center has looked at and 73 seconds quicker than the zippiest 8X burner we've tested.



THIS QUICK CD burner from HP connects via IDE and comes with a very friendly software bundle.

The 9310i also wrote to CD-RW discs with aplomb, packet-writing 100MB to disc in only 3 minutes, 23 seconds—the fastest time in its class.

The 9310i also delivers a generous software bundle. Adaptec's Easy CD Creator 3.5 handles basic disc creation, and the same company's DirectCD 2.5 takes care of packet writing. Meanwhile, HP Simple Backup provides disaster recovery capabilities; the Neato CD labeling kit, with its handy applicator tool, lets you spruce up plain-faced CDs; and Sonic Foundry's Acid lets you create loop-based music. For HP's nearly identical $299 9300i model, Corel's Print Office replaces Acid in the software bundle.

The 9310i carries a one-year warranty, and includes 6 a.m. to 6 p.m. (MST) telephone support. The only catch? The call is on your dime.

—Jon L. Jacobi ▶

HP CD-Writer Plus 9310i

PRO: Fastest IDE CD-R burner.
CON: No toll-free support.
VALUE: Surprisingly fast write speeds save time on every CD-R.
Street price: $299
Hewlett-Packard
970/635-1000
www.hpcdwriter.com

SAMSUNG
ELECTRONICS
X-MEN
THE NEW
MP
Valiantly
fighting
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of ordinary
technology
Not your ordinary
Superheroes, not your
ordinary monitor!
X-Men the movie in
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tuner & video inputs
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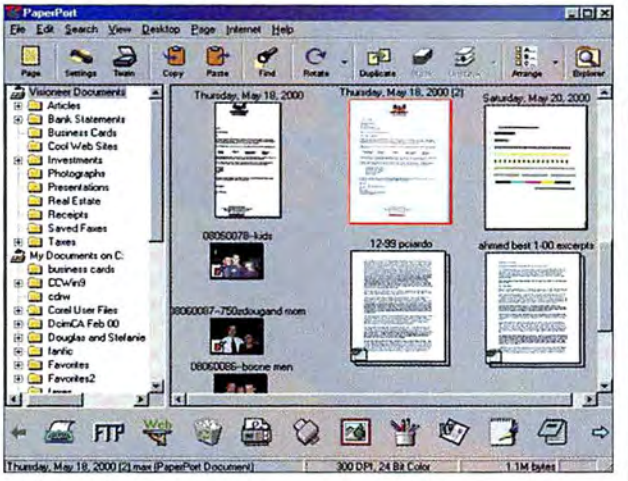
Virtually Organize Your Paper Pileups

DOCUMENT MANAGEMENT

NEED TO GET your desk organized? ScanSoft's **PaperPort Deluxe 7** is a new document management package aimed at getting stray papers off your desk and into your PC.

With the click of a button, the software lets you scan documents and add them to the PaperPort Desktop, where you can store them with related electronic documents. The $60 program ($30 upgrade) works with most TWAIN-compatible scanners.



PAPERPORT DELUXE 7 helps organize scanned documents and files.

In my tests, a shipping version brought documents directly to its Desktop and displayed them as thumbnails that I could enlarge, tweak, and print. And once PaperPort indexed my hard drive, I could store the thumbnails (pointers to a file's physical location on the hard drive) with thumbnails of other scanned files.

You can organize thumbnails by dragging and dropping them into nested folders, or you can use application links to launch documents from within PaperPort (it supports about 150 applications). A toolbar lets you scan directly to a supported application.

The program includes basic document and photo editing, as well as components for filling in forms, performing optical character recognition, and even generating Web pages.

—Melissa J. Perenson ▶

PaperPort Deluxe 7

PRO: Easy-to-use visual document management.

CON: A critical upgrade only if you need support for the latest apps.

VALUE: Smooth paper manager.

List price: $60 ($30 upgrade)

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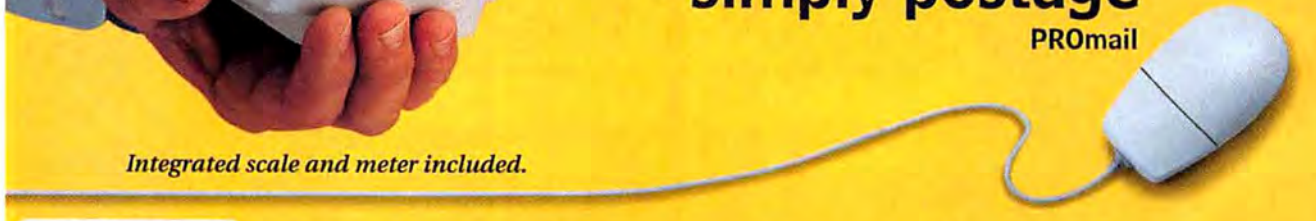
Integrated scale and meter included.

simply postage™
PROmail



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Ultraportable and Powerful Projector

PROJECTOR

WANT TO mesmerize the audience at your next mobile presentation? Try Epson's brilliant **PowerLite 710c** projector.

This fine presentation partner for road warriors is the first unit in its weight class with a brightness rating of 1000 ANSI lumens, supporting sharp 25-foot-diagonal images at 45 feet, as well as great scaled-down images for small-group presentations.

I hooked a shipping unit to a 500-MHz Pentium III notebook and projected a series of PowerPoint presentations, digital photos, and other images onto a 50-inch portable tabletop screen and a highly reflective white wall. I also connected it to a TV tuner and S-VHS VCR to check the quality of the video images it projected—no disappointments.

BRIGHT IMAGES at a price: Epson's petite, $6000 PowerLite 710c delivers brilliant images.

Several factors enhance the $6000 Epson's punch, starting with a three-panel LCD that delivers rich, saturated colors. Tipping the scales at just 5.8 pounds, the PowerLite has a native XGA resolution, but it can also resize and display VGA and UXGA resolutions. Features include an optical zoom lens, a built-in speaker, a 120-watt bulb and a keystone control for correcting image distortion. An infrared remote control permits users to adjust brightness, contrast, and other variables easily. There is no built-in laser pointer, however, and you can't save custom presets.

But this unit's virtues outweigh its shortcomings. For business travelers who don't mind paying a premium price, the PowerLite 710c delivers unmatched performance.

—Richard Jantz ▶

Epson PowerLite 710c

PRO: Very portable; bright and colorful images; good remote control.

CON: Expensive, no laser pointer.

VALUE: Top-notch performance in a portable projector.

Street price: $6000

Epson America

800/463-7766

www.epson.com

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Dialing for No Dollars: Actiontec's Net Phone

INTERNET TELEPHONE

I CAN'T ALWAYS get through to my Mom—at least I couldn't while testing Actiontec's **Internet Phone Wizard**, a nifty new product that connects your telephone to the Internet to allow free U.S. long-distance calling. When it works, the system convincingly mimics a regular call, but it didn't succeed every time.

I found that when I called Mom, my 56-kbps winmodem slowed to 28 kbps. With the first calls, the telephone at Mom's house rang and I could hear her answer, but she couldn't hear me. After several tries, we finally made contact, but the sound was occasionally choppy. Later, I used a DSL connection in the PC World Test Center and got much better results.

The $100 USB shipping unit I tested resembles an external modem, with one modular jack to accommodate an analog phone line and a second jack for plugging in a standard telephone handset: Tap the phone's pound key twice to toggle between Internet and analog calls.

THE MISSING LINK: Connect a regular telephone to the Internet.

The Phone Wizard sends calls through one of several Internet telephony service providers, which patch Internet calls through to anyone you dial who has a standard telephone connection. Actiontec's unit can work with any of five ITSPs, but it integrates only one (Deltathree.com) into its own software. Setup was easy on my Win 98 PC. (Win 2000 and Millennium versions are in the works.)

The ITSPs' free, ad-supported services have attracted major customer demand, and Internet calling is promising, but I won't be dumping my long-distance carrier just yet.

—Seán Captain ■

Actiontec Internet Phone Wizard

PRO: Facilitates free long-distance calls from a regular phone.
CON: Uneven quality, ITSPs request personal data and use banner ads.
VALUE: Good for chatty folks who value savings over sound quality.
List price: $100 (USB version), $80 (PCI card)
Actiontec
800/797-7001
www.internetphonewizard.com

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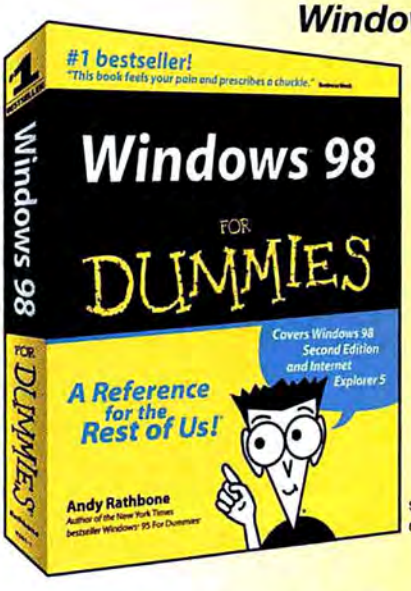

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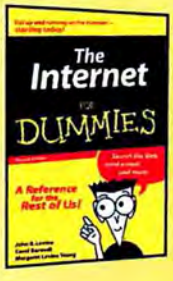

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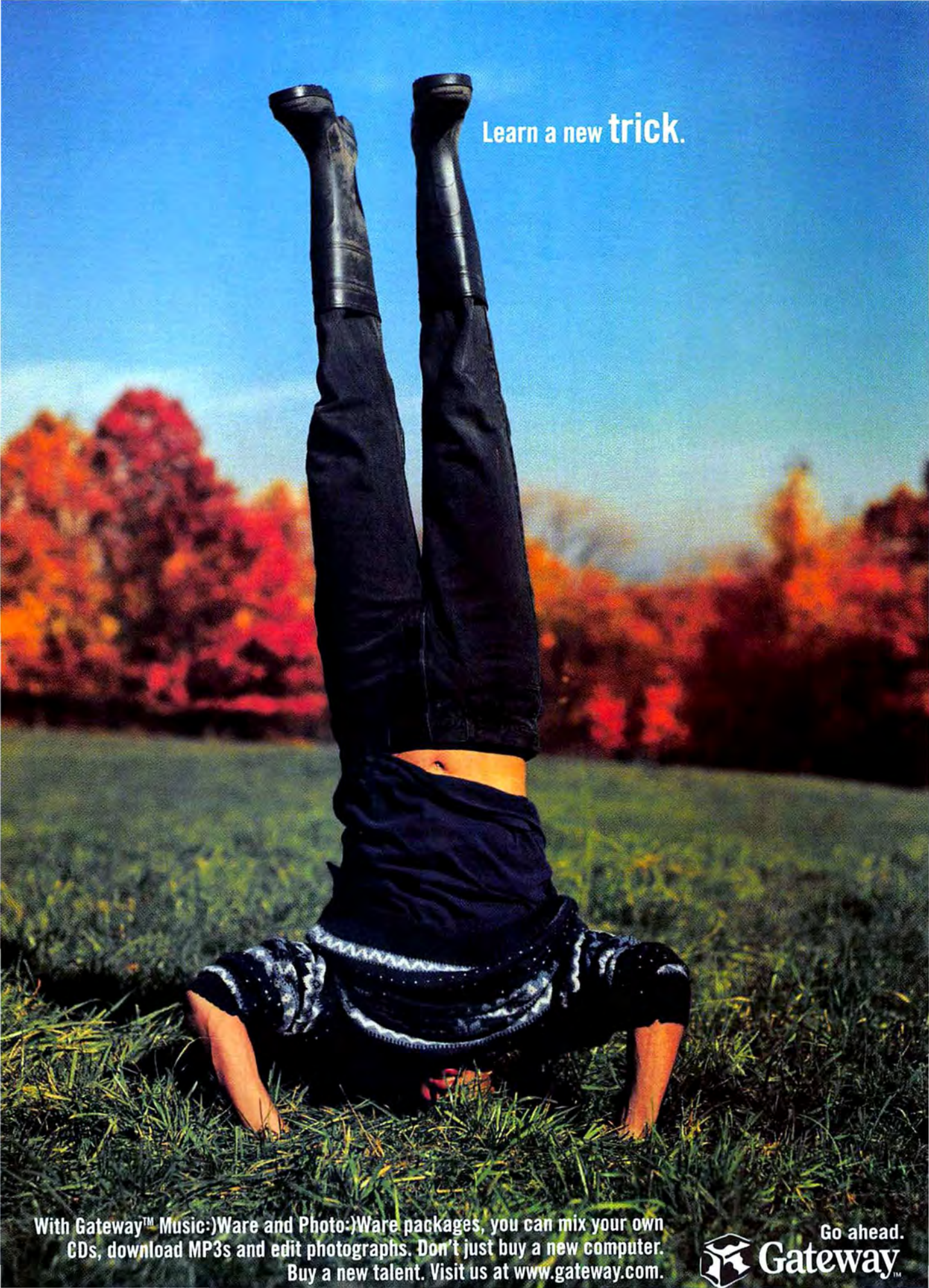
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Gateway Performance 800

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- 64MB SDRAM
- EV700 17" Monitor (15.9" viewable)
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- 30GB UATA66 7200 RPM Hard Drive
- 12X DVD-ROM Drive
- Sound Blaster® Live!™ Value Card
- Boston Acoustics® BA735™ Speakers w/Subwoofer
- 56K[1] PCI Voice Modem
- Microsoft® Windows® 98 Second Edition
- MS® Works Suite 2000 Software

$1599 or as low as **$45**/mo. (APR 14.9%) for 48 mos.*

Gateway Performance 866

- Intel Pentium III Processor 866MHz
- 128MB SDRAM
- EV700 17" Monitor (15.9" viewable)
- 32MB NVIDIA RIVA TNT2 Graphics Accelerator
- 30GB UATA66 7200 RPM Hard Drive
- 16X DVD-ROM Drive
- Sound Blaster Live! Value Card
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- 56K[1] PCI Voice Modem
- MS Windows 98 Second Edition
- MS Works Suite 2000 Software

$1999 or as low as **$56**/mo. (APR 14.9%) for 48 mos.*

Gateway Performance 933

- Intel Pentium III Processor 933MHz
- 128MB SDRAM
- EV910 19" Monitor (18" viewable)
- 32MB NVIDIA GeForce2 GTS™ DDR AGP Graphics
- 30GB UATA66 7200 RPM Hard Drive
- 16X DVD-ROM Drive
- Sound Blaster Live! Value Card
- Boston Acoustics BA735 Speakers w/Subwoofer
- 56K[1] PCI Voice Modem
- MS Windows 98 Second Edition
- MS Works Suite 2000 Software

$2499 or as low as **$70**/mo. (APR 14.9%) for 48 mos.*

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Gateway Music:)Ware Packages

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$229 (for desktop PC)

Digital Audio Creator Pack
Digital Audio Player, Getting Started Guide, Three-hour "Using Your PC to Explore Digital Music" Course (Instructor-led training at a Gateway Country store[1])
$299 (for desktop or portable PC)

Extreme Audio Pack
CD-RW (CD-Rewritable Drive), CD Stomper Pro Labeling Kit, Digital Audio Player, Getting Started Guide, Three-hour "Using Your PC to Explore Digital Music" Course (Instructor-led training at a Gateway Country store[1])
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intel inside
pentium® III

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- 3.5" Diskette Drive
- V.90 56K[1] Modem
- MS Windows 98 Second Edition
- MS Works Suite 2000 Software

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- 14.1" XGA TFT Color Display
- Intel Pentium III Processor 600MHz
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- 10X Min/24X Max CD-ROM Drive
- V.90 56K[1] Modem
- 2X AGP 3-D ATI Mobility™-M w/4MB SDRAM
- MS Windows 98 Second Edition
- MS Works Suite 2000 Software

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- Intel Pentium III Processor 700MHz
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- 12GB Ultra ATA Hard Drive
- 8X DVD-ROM Drive
- V.90 56K[1] Modem
- 2X AGP 3-D ATI Rage Mobility-MI w/8MB SDRAM
- MS Windows 98 Second Edition
- MS Works Suite 2000 Software

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Digital Camera, Photo Editing Software, Premium Photo Paper, Getting Started Guide, Three-hour "Using Your PC With Digital Photography" Course (Instructor-led training at a Gateway Country store[3])
$449 (for desktop or portable PC)

Electronic Photo Album
USB Scanner, CD-RW (CD-Rewritable Drive), Photo Editing Software, CD Stomper™ Pro Labeling Kit, Getting Started Guide, Three-hour "Using Your PC With Digital Photography" Course (Instructor-led training at a Gateway Country store[3])
$349 (for desktop PC)

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- 20GB Ultra ATA Hard Drive
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- V.90 56K[1] Modem
- MS Windows 98 Second Edition
- MS Works Suite 99 Software

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2. TO AVOID BEING CHARGED A MONTHLY FEE, CANCEL BEFORE ONE-YEAR PERIOD ENDS. One-year period begins 30 days from receipt of system. $1.50 per hour used over 150 hours per month. You may incur surcharges even during promotional period for premium services, or long distance charges on your phone bill, depending on location and calling plan. Communication surcharges may also apply with some access numbers and in AK. Non-local access via 1-888# 10¢ per minute. New U.S. members only. Major credit card required. Use may be limited, especially during peak usage. For details, call 1-800-846-2000.
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4. Offer expires July 31, 2000.

THE ASP OF CHOICE

Corio delivers rapid ROI and lightning-fast application deployment

It's no surprise that venerable companies like Forrester Research predict that annual user spending on application service providers (ASPs) will grow twenty-fold in the next four years, to $10 billion. After all, ASPs offer users a combination of fast time to market for new applications, a solution to the IT skills crunch, and an answer to the expense of application maintenance and updating.

When dealing with an ASP, users pay for their applications over time and on a per-use basis, rather than paying for all the hardware, software, networking, and application development costs up front.

For more than 100 companies today, including the likes of HomeGrocer.com, Lycos, and Excite@home, the ASP of choice is Corio, Inc. One such customer is Clarent Corp., provider of Internet telephone systems. Says Richard Heaps, Clarent's COO, of his experience with Corio, "We went from generation zero to state-of-the-art in one leap and did not add anything to our overhead internally."

What Clarent and others have discovered is that in a world where ASPs are popping up all over, there are significant differences among them, particularly when users want best-of-breed applications and ultra-fast time to market.

Corio's customers will achieve a 70% reduction on average in total cost of ownership (TCO) in the first year versus traditional application development models, and a 30% to 50% TCO reduction over a five-year period. You can calculate your own savings by using the Corio ROI Calculator™ at www.corio.com/spd.cfm?spi=roi. You'll see graphic proof of your TCO savings over five years as well as the return on investment of the Corio solution.

Need speed to market with your application? Corio Express™ offers users pre-packaged applications, including a PeopleSoft application, that can be brought up live in just ten days, compared with an implementation time of several months if the application were developed in-house.

APPS ON TAP

A fast-evolving company, Corio has moved swiftly beyond the early ASP model of simply reselling and hosting a single application. Corio has gathered leading applications for all major functional areas of the enterprise and offers these applications as a truly user-friendly, integrated solution over a secured network. The applications are provided from Orion™, Corio's technology platform, which allows some customizations of the applications to be written just once and then deployed universally.

Notes Virender Ahluwalia, Finance Director at Vertical Networks, Inc., a Corio customer, "Hosting alone is not enough. A system that is not integrated is of little value."

And in a move that puts even more distance between Corio and the rest of the ASP pack, Corio has introduced iView™, a hosted enterprise portal that will allow users to access hosted applications and other services via a Web browser. When it is broadly available next quarter, Corio iView will string together structured data, unstructured content, and Web resources, as well as hosted applications, into a single point of access.

For example, let's say a salesman running through an airport to an off-site appointment needs current data on product pricing. He's carrying nothing more than a wireless palm device, and the data he wants resides on a large application, something he's not about to open with a palm appliance. With iView, he'll be able to access and download the data he needs on the fly via a Web browser without actually having to open the big application. Now that's convenient!

CORIO

■ *For more information on this leading-edge solutions provider, point your browser to www.corio.com or call San Carlos, Calif.-based Corio at 650-232-3000, or toll-free at 1-877-267-4627.*

CORIO

APPLICATIONS ON DEMAND

SECRETS TO SUCCESS: No. 135

George Bell, President, Excite@Home

How do we manage our growth?

We hired Corio.

Excite@Home knew they would need top tier business applications to manage their rapid growth. They hired Corio. Corio hosts leading applications covering e-Commerce, Customer Relationship Management and ERP—all fully integrated. Simply access any of these applications over a secure network for a monthly fee. Lower total cost of ownership. No IT worries. Like Excite@Home, focus on your core business—and let Corio do the rest.

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UPDATE ON
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JSC

Best of the Web

Where to go for computer gear, online storage, search and Web tools, shopping agents, and more. Leaders in 32 categories duke it out in our Battle of the Champions.

By Brad Grimes and the Editors of PC World

OKAY, SO WE'RE NOT THE FIRST to publish an article with this title. News magazines, finance magazines, family magazines—everybody's gotten into the act. Even your local newspaper has probably ventured to pick the Best of the Web. But how many of these articles have really said which site is the Web's very best? Call us crazy, but we're gonna do it. We won't ruin the surprise—skim ahead if you must—but in this article, we name the single best site on all the Web. Along the way, we pit dozens of great sites against each other and name our favorites in 32 categories, including news, sports, travel, music, and lots of tech-related areas.

We began our search by dividing sites into four general classes: e-commerce, information, services, and recreation. We subdivided each of these sections into 8 categories, from auctions to Webmaster tools, and picked the 2 best sites in each of these 32 categories. That adds up to 64 outstanding sites, which we went on to rate on four criteria that apply to any Web site:

➤ **Ease of use:** How good are the site's navigation tools? Is it easy to find stuff? Fancy features aren't of much use if a site is a chore to navigate.

➤ **Breadth of content:** If it's a news site, does it cover everything you'd expect a news site to cover? Sites that are one-trick ponies may suffer here.

➤ **Usefulness versus the Real World:** Is a given search engine a better way of finding data in a sea of sources than, say, your local library's card catalog? Is Homestead a better way of sharing information with friends and family than photos, letters, and phone calls?

➤ **Gee-whiz factor:** Does the site do something interesting and new? Before EBay, for example, who would have thought that a Web site could be used to auction off unwanted knick-knacks to bidders around the world?

Using these criteria, editors named a winner in each category. We took those 32 winners and threw them into a tournament draw (see "Tournament of Web Champions," page 104). A fresh panel of editors then picked their favorites, based on the same four criteria.

In the end, we narrowed 64 of the finest sites on the Web down to one winner (which we reveal on page 106). But enough with the nuts and bolts. Read on and follow our quest for the Best of the Web. ➤

ILLUSTRATIONS BY JOHN CUNEO

E-Commerce

BOOKS & MUSIC

Amazon.com vs. Bn.com Once upon a time, all Amazon.com did was sell books and music. Today, plumbing supplies and power tools intrude upon the simple pleasure of browsing its copious aisles. But Amazon is still the leader in customer service. When a product shows up damaged, Amazon doesn't blink before sending a replacement, along with a prepaid label for returning the defective item. Amazon shoppers post lots of helpful reader reviews; for some reason, such evaluations are far sparser at Bn.com, Barnes & Noble's online arm. Bn.com does beat Amazon for out-of-print books: It stocks them for instant delivery, while Amazon must search and get back to you.

winner **Amazon.com**

CAR BUYING

Autoweb.com vs. CarsDirect.com You still can't kick tires or take a test drive on the Web, but the Net is great for car research. While Autoweb.com is good, CarsDirect.com is better. You can spin cars 360 degrees to view them from every angle, and the site's helpful links explain features and costs. We also like the up-front way it tells you when a popular model—say that PT Cruiser you have your eye on—is likely to be on back order.

winner **CarsDirect.com**

COMPUTER GOODS

CDW.com vs. PC Connection When you're ready to buy computer stuff, why head for the Web instead of your local superstore? Two reasons: better selection and lower prices. Both CDW.com and PC Connection (www.pcconnection.com) do well in those areas, and each provides a shopping experience that puts many competitors to shame. And both offer tech support for the products they sell. CDW.com's site is easier to navigate, but in the end, we slightly prefer PC Connection, mostly because of its low overnight shipping fees and superfast delivery: You can place an order at 2 a.m. ET and have it in your hands later that same day.

winner **PC Connection**

ELECTRONICS

Crutchfield.com vs. Outpost.com Crutchfield.com is one classy online electronics retailer. It offers free lifetime technical support, and if you send an item back for a refund, the company will foot the bill for return shipping. But here at *PC World* we're freebie fans. And Outpost has one of the hottest freebies around: free overnight delivery on consumer electronics products of all sorts. The flashing ads are annoying, but if you can ignore them, you'll find helpful information.

winner **Outpost.com**

BIDDING FOR GREATNESS: If it exists, it's probably up for auction at the World Wide Flea Market known as EBay.

FINANCIAL SERVICES

Quicken.com vs. Charles Schwab Charles Schwab invented discount stockbroking, and his eponymous Web site (www.schwab.com) is a standout, especially coupled with Schwab's national network of field offices. But in a close race, Quicken.com wins for the sheer array of financial services that it provides. You can get a loan, buy insurance, pay bills, and plan for retirement. And a cool utility called Quicken Shopper automatically scouts out deals while you shop online.

winner **Quicken.com**

ONLINE AUCTIONS

EBay vs. Yahoo Auctions How many sites can go head-to-head with a Yahoo offering and come out in front? EBay (www.ebay.com) does. When we checked, the site claimed over 4.5 million items. Our editors say they've bought things they would not have found in years of searching offline—and sold stuff they wouldn't wish on the Salvation Army. And EBay's buyers and sellers are a mostly honorable lot. Yahoo Auctions (auctions.yahoo.com) is also well stocked, but it lacks EBay's lively community. The auction halls often seem dead, with pages of listings and no bids.

winner **EBay**

SHOPPING AGENTS

Evenbetter.com vs. MySimon If you're shopping for a book, CD, or movie, Evenbetter.com will quickly tell you which Web stores have it, at what prices. But MySimon (www.mysimon.com) takes the prize by covering far more ground. You can sniff out deals on everything from PCs to furniture. It's clear that merchants pay to pop up at the top of search results, but that's a minor inconvenience given the huge number of merchants MySimon sifts through. The fact that site mascot Simon looks like a character out of *Toy Story* in no way influenced our review.

winner **MySimon**

TRAVEL PLANNING

Expedia.com vs. Trip.com Leave it to a Microsoft site to start strong and then adopt a rival's ideas to help make it the best of its kind. Expedia.com was great even before it offered name-your-price deals on plane tickets and hotel rooms, à la Priceline.com. Articles about cruises, golf vacations, and more are often fun and nearly always useful. Because the site has such clout, special deals seem to grow on trees. Trip.com is also full of excellent travel facts, and its IntelliTrip feature hunts down special fares at major airlines. In the end, Trip.com has less information and is a bit harder to use than Expedia.com. But its deals still provide a useful reality check.

winner **Expedia.com**

Information

CAREER

Craigslist vs. Monster.com Craigslist (www.craigslist.com) is the best job resource for what may be the hottest market in the world: the San Francisco Bay Area. This site has the best leads to employers and employees in dot-com heaven. But overall, Monster.com rules. It's easy to search for jobs that match your interests, and there's lots of career advice (easier to swallow from a Web site than from a nagging relative). With 400,000 job listings, there's a good chance you'll find several that interest you.

winner **Monster.com**

COMPUTING

CNet.com vs. Tom's Hardware Guide We're naturally biased in favor of PCWorld.com, so we've disqualified ourselves. CNet.com gets our nod on the strength of News.com, its first-rate tech news channel, and Download.com, its shareware site. Do CNet's e-commerce features, such as auctions, affect its reviews? They don't seem to, and users can post reviews, too. Tom's Hardware Guide (www.tomshardware.com) has a narrower focus, with in-depth looks at PC components. It's aimed at geeky types, but the info is superb.

winner **CNet.com**

CONSUMER GUIDES

Deja.com vs. Productopia At Deja.com, you can find out what real people think of the DVD player you're considering, or uncover the top-rated men's razor blade. Navigation is easy, considering the enormous range of products reviewed. And the origins of ratings are clear, down to the number of reviews the scores are based on. Productopia (www.productopia.com) mixes its own reviews in with user ratings; the evaluations are helpful, but user reviews are much scarcer than at Deja.

winner **Deja.com**

ENCYCLOPEDIAS

Britannica.com vs. Encarta Encarta (encarta.msn.com) is a fine online encyclopedia, but much of what it offers is available only to owners of Encarta on CD-ROM. Britannica.com, by contrast, gives you the entire contents of the standard-bearing print encyclopedia for free. There's a free download for using the site with a Palm VII, and a fine search engine for taking your quest to the Web at large. In short, if you think encyclopedias are dull, you haven't visited Britannica.com lately.

winner **Britannica.com**

YOU COULD LOOK IT UP: At Britannica.com, the tone is thoughtful and the scope is literally encyclopedic.

HEALTH

Mayo Clinic Health Oasis vs. WebMD Mayo Health (www.mayohealth.org) has long been a favorite of ours; WebMD (www.webmd.com) has not. But WebMD's recent redesign has made it easier to find information and cranked up the quality of its articles, search tools, and community features. Now it's the health site to beat. Still, when you need a second opinion, jump over to Mayo for its readable, in-depth articles.

winner **WebMD**

HOW-TO

Learn2.com vs. NoWonder Learn2.com is both educational and fun. Tutorials on everything from caring for a rabbit to finding a financial planner are free; you pay a fee for in-depth classes on PC-related topics like using Microsoft Office. Computer help is also on tap at NoWonder (www.nowonder.com), which lets you pose queries to a network of tech experts. The question that dogs us: Is this help desk really better than your PC maker's support line?

winner **Learn2.com**

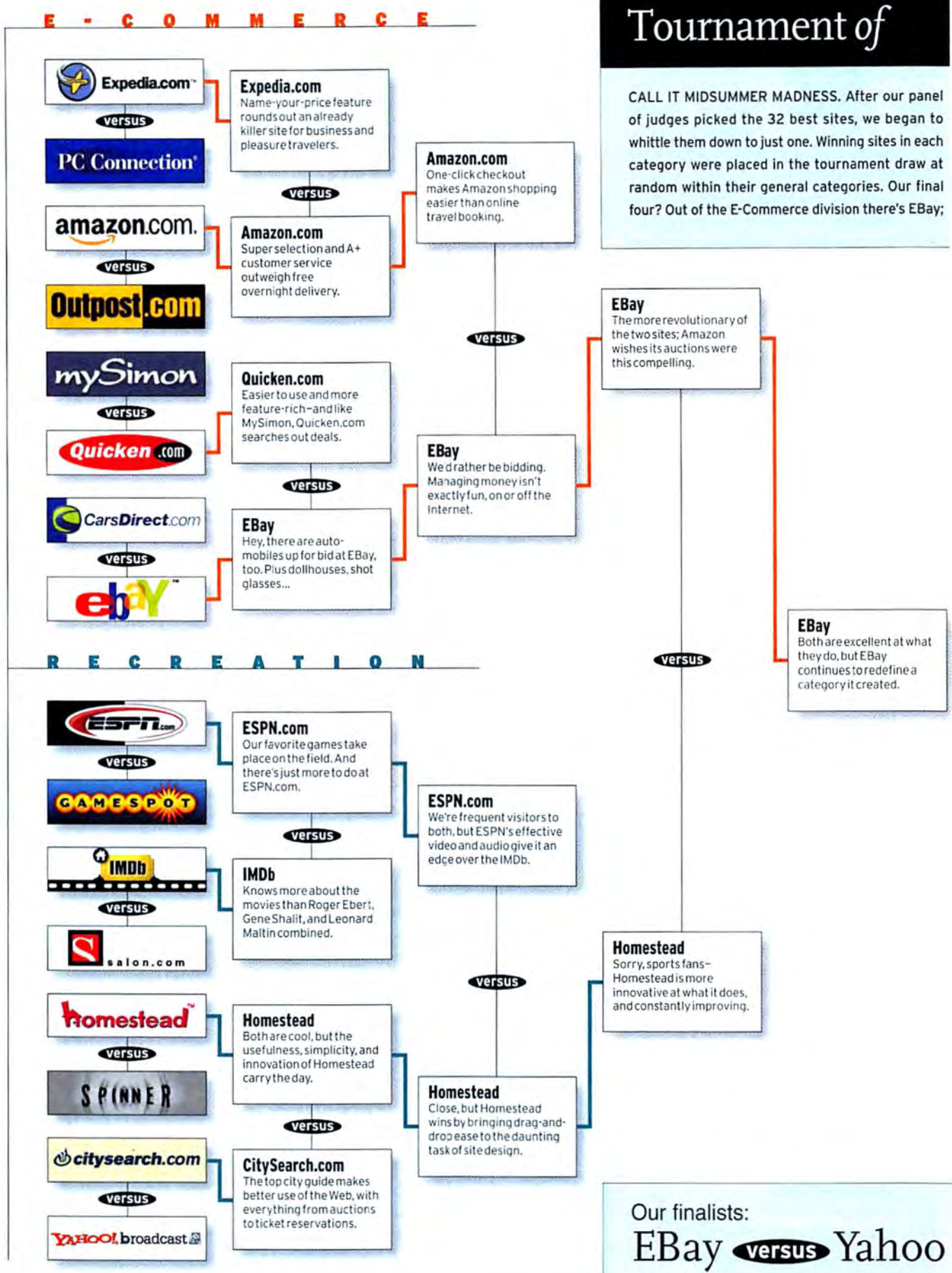
My Favorite Site: The Ultimate Band List

Who needs Napster? For my money, the best music site on the Web is still the Ultimate Band List (www.ubl.com). Along with music news, interviews, and concert info, it lists Web pages for about 100,000 artists. Covering everyone from Pavement to Pavarotti, it's the Yahoo of music sites. –Eric Dahl, staff editor

PHOTOGRAPH: JAY BLAKESBERG

Tournament *of*

CALL IT MIDSUMMER MADNESS. After our panel of judges picked the 32 best sites, we began to whittle them down to just one. Winning sites in each category were placed in the tournament draw at random within their general categories. Our final four? Out of the E-Commerce division there's EBay;

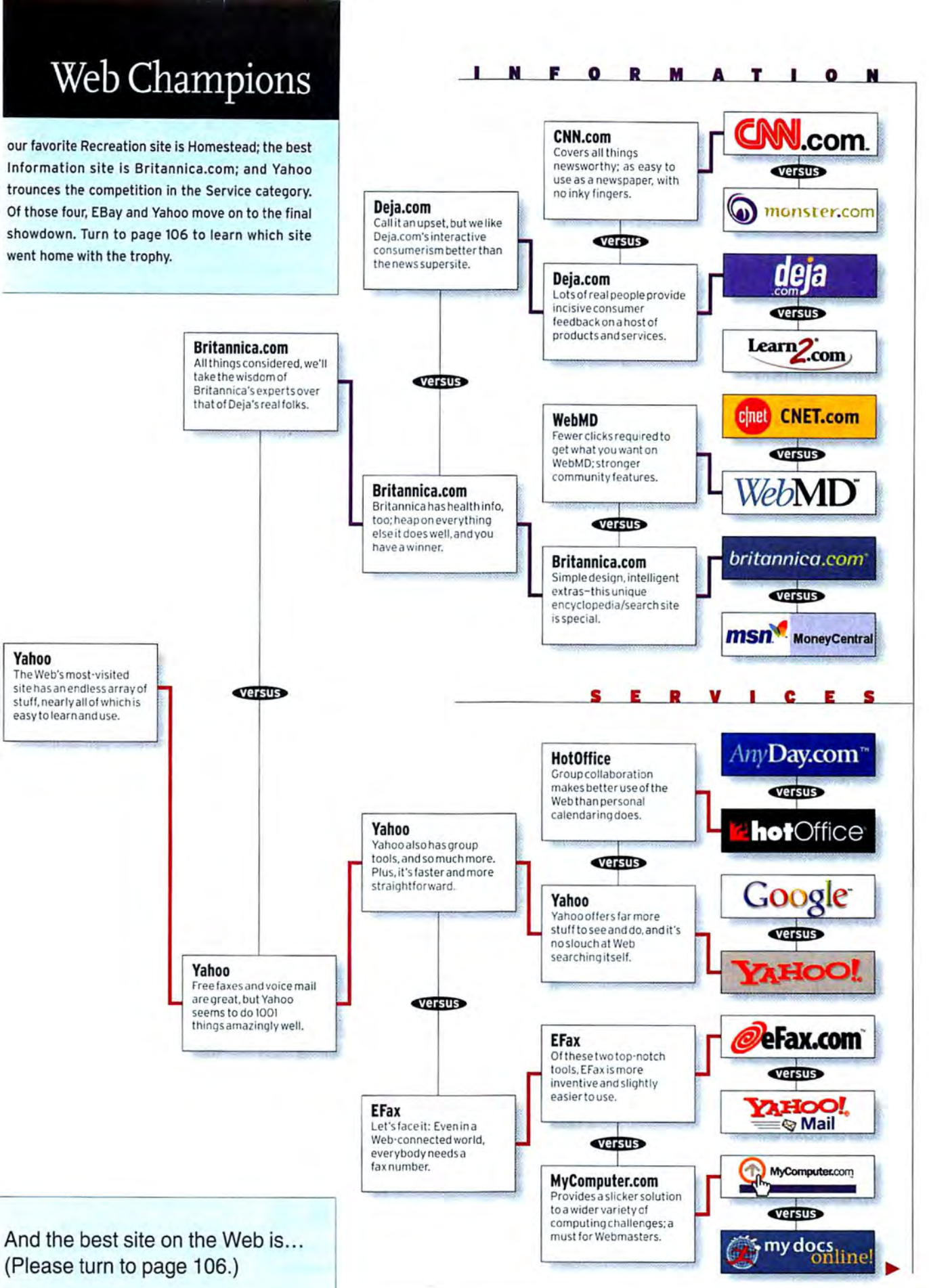


Our finalists:

EBay versus Yahoo

Web Champions

our favorite Recreation site is Homestead; the best Information site is Britannica.com; and Yahoo trounces the competition in the Service category. Of those four, EBay and Yahoo move on to the final showdown. Turn to page 106 to learn which site went home with the trophy.



And the best site on the Web is...
(Please turn to page 106.)

NEWS

CNN.com vs. the New York Times CNN.com (a partner of our parent company, International Data Group) remains the best online news source, thanks to first-rate reporting and plentiful video clips. Sister sites like CNNfn.com (for financial news) are also tops. The New York Times on the Web (www.nytimes.com), another online news titan, has some of the country's best journalism. But it doesn't match CNN's scope and multimedia appeal.

winner **CNN.com**

PERSONAL FINANCE

MSN MoneyCentral vs. The Motley Fool As always, The Motley Fool (www.fool.com) is one of the Web's very best sources of commentary and education on all things financial. But MSN MoneyCentral (moneycentral.msn.com) has quietly become king. Its writers are insightful and engaging, and the services rival those of Quicken.com. The deluxe stock analyzer requires a download, but it may be the Web's most powerful free research tool.

winner **MSN MoneyCentral**

Services

COMMUNICATIONS

EFax.com vs. Onebox.com Do you want your free fax and voice-mail number to have an area code different from your own, or do you want it to have the same area code but require a four-digit extension number? After trying to figure out when to dial an extension when sending a fax, we prefer an extensionless area code. That's what EFax.com provides. We also like EFax's intuitive interface and the way it forwards faxes and voice mail to any existing e-mail account. Onebox can only route everything to its own Web-based account.

winner **EFax.com**

FREE E-MAIL

Hotmail vs. Yahoo Mail Both of these services have tons of features and are easy to use. Hotmail's (www.hotmail.com) ability to scan incoming attachments for viruses is a useful feature that Yahoo Mail lacks. But Yahoo Mail (mail.yahoo.com) wins by a nose because it lets you collect mail using any POP3 e-mail package. Hotmail integrates only with Outlook Express 5.0. Yahoo can also notify you of new mail by sending an instant message if you have Yahoo Messenger installed.

winner **Yahoo Mail**

The Best Site on the Web: EBay

THE FACE-OFF between EBay and Yahoo is a double-overtime thriller. Yahoo is more practical, and its emphasis on function over flash is worth celebrating. But while Yahoo isn't really *exciting*, EBay is. So you heard it here first: EBay is the Web's best site. No other site is quite as innovative, fun, useful, and addictive. It's also one of the few Net destinations that appeals to everybody from tech-savvy twenty-somethings to acquisitive grandmothers. *PC World* staffers have bought everything from telescopes to tanning beds, and sold off fountain pens and paragliding equipment. Despite the occasional disappointing deal, we keep going back for more.

ONLINE STORAGE

My Docs Online vs. X:drive X:drive (www.xdrive.com) gives you 25MB of storage space on the Net for free (more if you refer friends or visit often), and its cool desktop utility lets you drag and drop files between your virtual drive and your PC. However, we're more partial to My Docs Online (www.mydocsonline.com). The service is much like X:drive's (20MB of free space, a virtual drive utility), but you can access files you store online from wireless devices like the Palm VII. You can't open or use the files, but you can send them to friends and colleagues as e-mail attachments. That's the kind of innovation that makes a site stand out.

winner **My Docs Online**

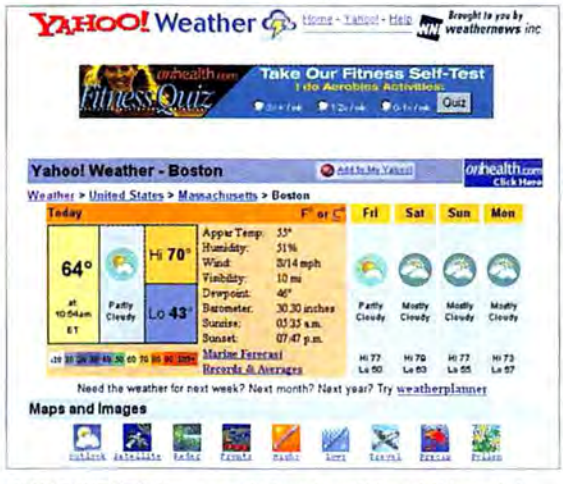
PORTALS

MSN vs. Yahoo After a slow start, Microsoft's MSN (www.msn.com) has evolved into a fine destination, thanks in part to tight links to other Microsoft sites such as MSNBC. Still, no other portal measures up to the one that started it all: Yahoo (www.yahoo.com). Is there anything you *can't* do at Yahoo? Get a credit report? (You can do that.) Print business cards? (That, too.) Pay your bills? (Sure.) Auction off jewelry? Manage your stock portfolio? Search the Web? (We think you get it.)

winner **Yahoo**

SCHEDULERS

AnyDay.com vs. Excite Planner We admit that we're dubious about whether most folks need to put their calendar online. But AnyDay.com (recently bought by Palm Computing) is a sleek, highly functional online PIM, with a utility that synchronizes calendar and contact information with a range of PC programs and palmtops. It takes the crown because of extras such as a slick event planner and bountiful printing options. Excite Planner's (planner.excite.com) attractions include its ability to remind ▶



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you of events by e-mail or pager, and a notepad feature for jotting down ideas. Very nice, but we like AnyDay a bit more.

winner **AnyDay.com**

SEARCH ENGINES

Fast Search vs. Google Many a former search engine now wants to give you everything from free e-mail to a home loan. Not so our two favorites. Fast Search (www.alltheweb.com) uncovers links that other engines overlook. But sometimes its first results aren't the most relevant. So we prefer the uncanny accuracy of Google (www.google.com). The site even has an extra search button called "I'm Feeling Lucky" that takes you to the one site Google thinks is most pertinent to your query. More often than not, it's a good match.

winner **Google**

WEBMASTER TOOLS

BCentral vs. MyComputer.com Microsoft's BCentral (www.bcentral.com) is a powerful resource that can help you submit your site to search engines, advertise it with banner ads on other sites, and more. But the site is busy, making it tough to figure out what you can accomplish. MyComputer.com's streamlined interface, by contrast, makes beefing up your Web site a snap. It includes the same tools as BCentral, plus features such as polls, message boards, and chat rooms. Many features are free; others are fee-based. Either way, it's a near-painless way to improve your growing Web site.

winner **MyComputer.com**

WORKGROUP TOOLS

HotOffice vs. Huddle24-7 Newcomer Huddle24-7 (www.huddle247.com) is promising, but HotOffice (www.hotoffice.com) is still our favorite Web collaboration tool. It's now available in a free, ad-supported version that gives you 40MB of server space—almost as much as the 50MB provided by Huddle24-7, which charges $10 a month plus $5 per user. And while both services offer calendaring, e-mail, message boards, and document sharing, HotOffice has a few tools that Huddle24-7 lacked at press time.

winner **HotOffice**

Recreation

CITY GUIDES

CitySearch.com vs. Digital City Stop by the city-specific home pages at either of these two sites, and you'll get restaurant and entertainment reviews, weather, maps, sections for singles, and online auctions. CitySearch gets the nod over Digital City (www.digitalcity.com). It's a sister service of Digital City Ticketmaster Online, giving visitors easy access to local event tickets, and it lets you make hotel and restaurant reservations (golf tee times will be next). What's more, CitySearch has absorbed the content of Sidewalk.com, Microsoft's venture into city guides.

winner **CitySearch.com**

ENTERTAINMENT

IMDb vs. Mr. Showbiz Now that the Internet Movie Database (www.imdb.com) is owned by Amazon.com, it's harder to tell whether it's a great fan site or a portal for selling DVDs and videos. But the remarkable film database remains, plus a load of pithy TV and movie news. So IMDb remains our favorite entertainment site. Of all the PR-driven Hollywood sites (that's most of them), we like Mr. Showbiz (www.mrshowbiz.com) best. It's less glitzy than the others but more informative.

winner **IMDb**

E-ZINES

Feed Magazine vs. Salon.com Despite a redesign that has some readers carping, Salon.com delivers first-class journalism and criticism. Along with thoughtful, often quirky articles on politics, people, entertainment, and more, it makes excellent use of photos and video. In April, the site was showing the award-winning documentary *Regret to Inform*. Feed Magazine (www.feedmag.com) is another collection of insightful essays on news, arts, and history. Topics range from Hitler to the Napster controversy. It's superb reading but lacks the breadth of Salon.com.

winner **Salon.com**

GAMES

GameSpot vs. GameSpy.com If you'd rather spend your free time with a joystick than a good book, you will love GameSpot (www.gamespot.com). The reviews are top-notch, the tips and tricks ▶

My Favorite Site: AVWeb

As a budding pilot, I needed all the help I could get. And on AVWeb (www.avweb.com), I found it. No superslick Web graphics here—just a cornucopia of information for people who own and fly small planes. I've enjoyed this informal yet informative site so much, I'm now a contributor. —Yardena Arar, senior editor

PHOTOGRAPH: JAY BLAKESBERG

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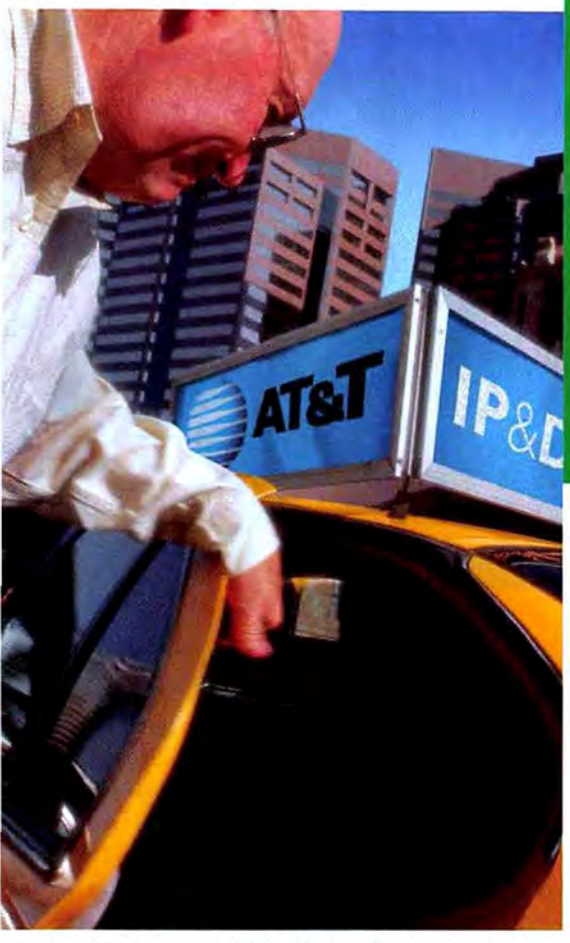
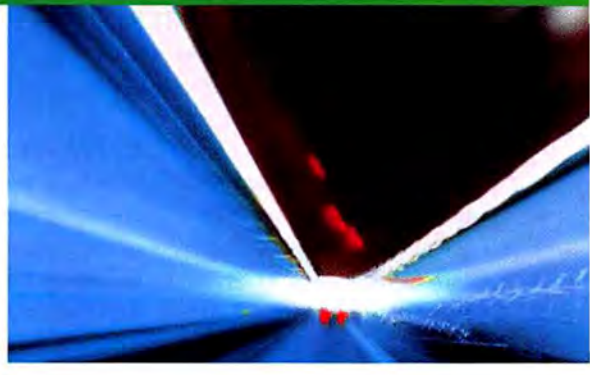


Craig Williamson – PGA Professional, Greens.com Executive. "AT&T allowed our company to work more efficiently and improve our online relationships with customers."



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insightful, and the free downloads plentiful. We also like the behind-the scenes articles on game design. Above all, GameSpot is well designed and easy to get around. The similar GameSpy.com can be sluggish and hard to navigate. Still, it's another essential bookmark for game fans. (So is GamePro.com, which we disqualified from this tournament because it's a sister site of PCWorld.com.)

winner GameSpot

MUSIC

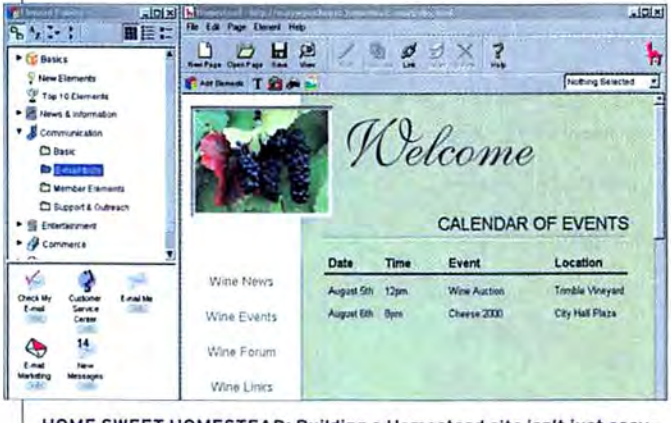
MP3.com vs. Spinner Spinner (www.spinner.com) is part radio network, part music library. Its potential grew exponentially when its mama company, America Online, agreed to merge with Time Warner, home to some of the biggest music labels around. Using the downloadable Spinner Plus 3, you can listen to preprogrammed music on over 120 channels—from opera to rockabilly. You can download customized playlists to load on your MP3 player or listen to from your hard drive. MP3.com also has a wide variety of music, all organized in a simple Yahoo-like directory structure, but who's ever heard of most of these artists?

winner Spinner

PERSONAL WEB PAGES

Homestead vs. Tripod If you've never tried Homestead you should give it a whirl right now. Seriously. We'll wait. Homestead (www.homestead.com) has always made creating a site as simple as dragging and dropping elements, and now it has even more tools and templates for shaping your site, whether you're building a family scrapbook or a small-business storefront. Tripod (www.tripod.lycos.com) also has a lot going for it, especially if you're a savvy Web designer. But it won't appeal to everyone because it's not nearly as straightforward as Homestead.

winner Homestead



HOME SWEET HOMESTEAD: Building a Homestead site isn't just easy—it's downright fun. Templates for popular projects help you get started.

RADIO

Live365.com vs. Yahoo Broadcast Why listen to radio on the Web instead of via a $10 clock radio? Because the Web gives you broadcasts from around the world. That's cool. And it's also where Yahoo Broadcast (broadcast.yahoo.com) comes in. The site has exclusive rights to programs from thousands of radio and TV stations. Brazilian music, British news, German soccer, and endless stuff from the good old USA—it's all here. Live365.com is a different proposition, but a neat one. Using tools provided by the site, regular folks can create their own online radio stations. It's fun, but finding something you want to listen to is a trial-and-error process.

winner Yahoo Broadcast

SPORTS

ESPN.com vs. The Sporting News When ESPN.com is acting sluggish (a rare happening, actually), head for the timely, comprehensive reporting at The Sporting News (www.sportingnews.com). But ESPN.com is still the sports site to beat. It's got all the news when you want it, plus some of the most insightful sports commentary around. It makes good use of video and audio, and its fantasy sports games are fun and competitive. Recently, the site's 3 Play sweepstakes has been reason enough to log on. There are daily and weekly cash prizes. Ka-ching!

winner ESPN.com

online *Brad Grimes, a former* PC World *executive editor, is a principal at Content Foundry. For reviews of more of our favorite sites, see www.pcworld.com/augoo/bestofweb.* ■

PHOTOGRAPH: JAY BLAKESBERG

My Favorite Site: Cheap Tickets

Someday I'll buy plane tickets at MoneyIsNoObject.com. But until the lotto balls fall my way, I'll shop at Cheap Tickets (www.cheaptickets.com). Besides great prices, it's got an easy interface, tons of flights, and free two-day delivery. Now, if I could only find FreeGuinness.com... —Dennis O'Reilly, senior associate editor

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PC Repair Undercover

BY GREGG KEIZER

Over half the repairs in our investigation were botched or overpriced. Here's how to protect yourself when your computer goes to the shop.

What if the odds of emerging from your doctor's office hale and hearty ran two-to-one against you? We'd be a nation swamped with shamans instead of surgeons. Fortunately, a visit to the doctor is generally nothing to fear. But your PC's trip to the repair shop may be another matter.

That's the sorry conclusion we must draw from our investigation of the state of PC repair. (We were joined for portions of our research by an undercover team from the TV newsmagazine *Dateline NBC*, researching its own feature on the topic.) When we first tackled this topic back in 1998 (see www.pcworld.com/apr98/repair), we encountered sloppy technicians, unnecessary repairs, and rampant rudeness. Two years later, have matters improved? Sadly, the more things change, the more they stay the same.

In all, we did business with 18 repair stores in six states. A dozen of these stores were branches of three national chains—Best Buy, Circuit City, and CompUSA—which together boast over 1200 outlets nationwide. This time we extended the investigation to include 6 mom-and-pop–style shops in as many cities across the country. We wanted to see if independent stores live up to their reputation of offering better customer service than the chains.

Chain retailers and independents don't exhaust your service options. Manufacturers that sell PCs directly, such as Dell and Gateway, handle repairs themselves, often via on-site service. And if you work in a medium-size or large company, you probably call on your IS department for help. But national chains and local computer shops remain a primary repair choice for consumers, especially for PCs bought at retail and those out of warranty.

Judging from our findings, that's terrible news. For every store that solved our problems quickly, courteously, and competently—and some did—more dropped the ball. When we left malfunctioning PCs for repair, half of ▶

ILLUSTRATIONS BY JORDIN ISIP

SERVING:
071
ISIP

the chain outlets didn't fix them, and a staggering 83 percent of the independents bombed. In the end, only 7 of the 18 stores did their jobs correctly; 6 of the 7 were Best Buy or CompUSA outlets.

SETTING THE SCENE

WE TESTED the mettle of repair shops by disabling 18 identical three-year-old Compaq Pentium II PCs. To measure phone support shrewdness, we corrupted the PCs' video drivers, which degraded image color and resolution. Good technicians should be able to identify the problem and guide users through the solution—which is to reinstall the driver—over the phone.

To measure the competence of in-store crews, our reporters took a balky PC into each shop. Previously, we had replaced the PC's working hard disk IDE cable with a defective one, leaving the system unable to boot. We also disconnected the CD-ROM audio cable, so the PC couldn't play music CDs. (We didn't mention this symptom; we wanted to see if the stores' technicians would be attentive enough to notice the loose cable.)

These malfunctions duplicate the problems we posed two years ago and are designed to stress-test service savvy. The malfunctioning drive cable—a relatively uncommon glitch—can't be identified at a cursory glance. A technician at the Rhode Island CompUSA, which fixed the PC in less than a day, called this problem "hard to diagnose, but easy to fix." Although it was unusual, he said he'd seen it himself four or five times.

Of course, not every service shop experience will match ours. Your problems may be easier—or harder—for a tech to diagnose and correct. But what our investigation does show isn't pretty.

Repair Tales

Cheapest repair: Best Buy, CA, fixed our PC for free.

Highest repair estimate: CompUSA, NY, wanted $727 for an unneeded motherboard swap.

Quickest turnaround: Best Buy, TX, fixed our PC in 35 minutes while we watched.

Slowest turnaround: Best Buy, RI, took more than a month to replace a faulty cable.

Most honest (albeit incorrect) advice: A phone rep at one of Circuit City's service centers told us that repair costs for our PC would be prohibitive: "It wouldn't be right to do the job."

Best deal from a mom-and-pop: Independent shop, CO, fixed the PC in 48 hours for $63.

THE UGLY TRUTH

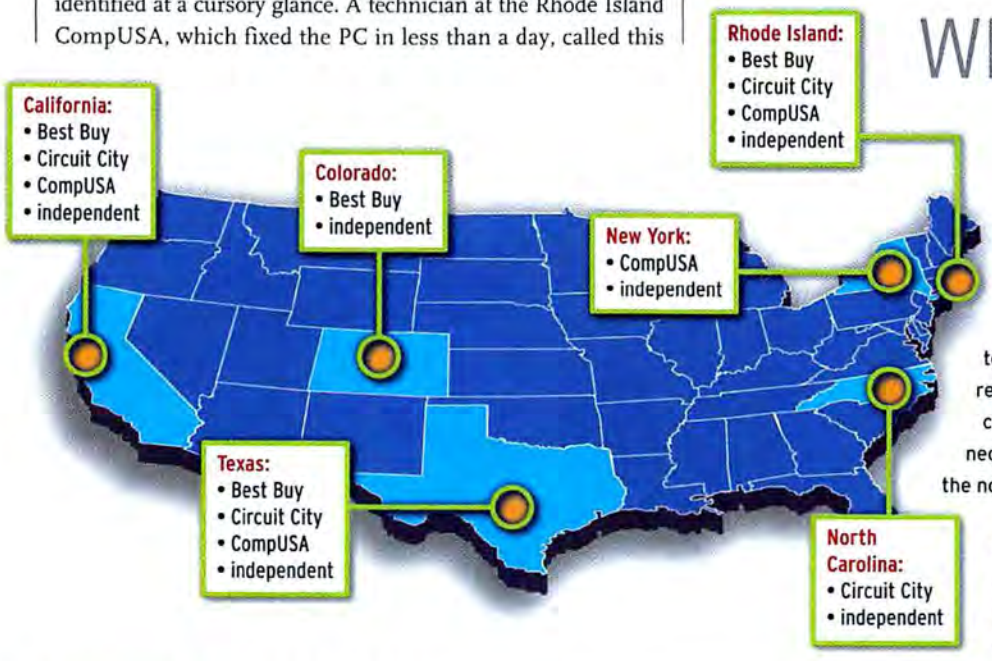
HOW BAD WERE our repair experiences? Consider the evidence:

- Of 31 total problems posed to 18 stores, 18 were misdiagnosed or left unresolved. That percentage of wrong responses is slightly higher than in our 1998 results.
- Of the 18 stores, 11 couldn't provide acceptable service for the bad hard disk cable problem. We had high hopes for the mom-and-pop shops here, but they disappointed us: Only 1 of the 6 got it right. And none of Circuit City's outlets made the grade.
- Only 8 of the 18 stores reinserted the CD-ROM audio cable.
- In 8 of 18 stores—4 mom-and-pops, 2 Circuit City outlets, 1 Best Buy, and 1 CompUSA—techs advised us to replace perfectly good parts. The average cost for these useless repairs: $340.
- When it came to cost, CompUSA's flat labor rate of $100 was steep, while Circuit City's seemingly cheap rate (just $20 up front) lost its luster since none of its techs correctly fixed our PCs.
- Of the 13 stores that offer phone support, 7 couldn't solve the video snafu; 2 Best Buy stores made the grade, as did 2 CompUSA outlets and 2 mom-and-pops. (Circuit City and one of the small independents don't provide phone support.)

Depressing, isn't it?

WHAT WENT RIGHT

INUNDATED WITH bad news, we treasured our successes. And indeed, some stores did the kind of work we wish on anyone burdened with a sick system. The stores that did right by us had a lot in common. Their techs were courteous, neither resorting to geek-speak nor talking down to us. They listened as we described



What? Where? How?

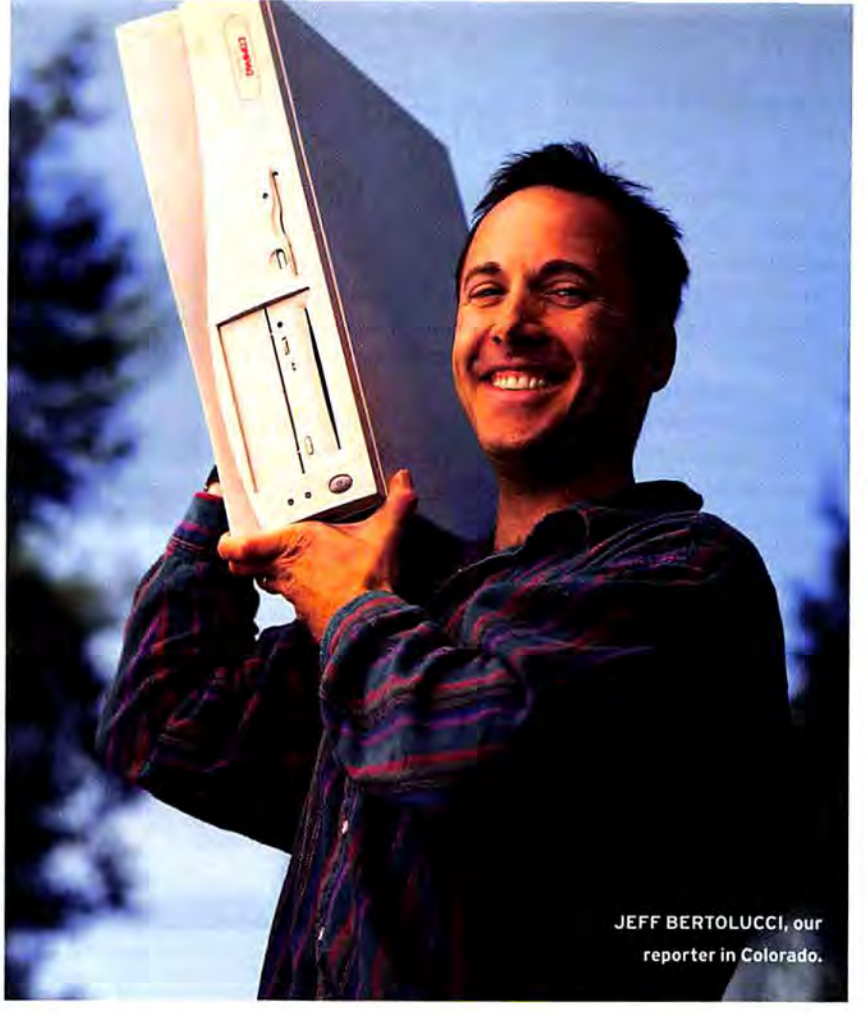
WE STARTED with 18 Pentium II-233-based Compaq Deskpro 4000 PCs. We then corrupted the graphics driver and made tech support calls for help. Next we replaced the functional hard disk cable with a damaged one, disconnected the CD audio cable, and took the now-broken PCs in for repair.

We went to four stores from each of the following chains: Best Buy, Circuit City, and CompUSA. We also tried six independent stores across the United States.

the problem and didn't leap to conclusions and stick with them, as did some of our worst-scoring technicians. And they didn't gouge us on the bill.

Take our Texas reporter's experience at his local Best Buy. The technician "was working on the other side of the counter, so I was able to observe the entire process." The tech quickly tried several troubleshooting measures, and then scrounged up a spare cable when he concluded the one in the PC might be defective. Just 35 minutes after entering the store, our reporter walked out with the fixed PC. The cost: a thrifty $25.

The Best Buy in California beat that price: Though the tech initially misdiagnosed the problem, he caught his mistake and fixed the PC without charging us a dime. Across the country at a CompUSA in Rhode Island, we dealt with courteous, savvy store reps at both drop-off and pickup, and the system was fixed in less than a day. But because CompUSA charges a flat rate of $100 for labor, the repair was pricey. (This flat-rate policy could work to your advantage if your system requires a labor-intensive repair such as a motherboard replacement.)



JEFF BERTOLUCCI, our reporter in Colorado.

PHOTOGRAPH: RAY NG

"Everything went right" during our visit to the Colorado independent store.

A Colorado store—the only independent to pass—was a model others could learn from. Located in an aging strip mall, it didn't look like anything special. But "everything went right," says our reporter. "They knew what they were talking about, they were courteous, and they fixed it within 24 hours." The store charged a reasonable $60 for labor and just $3 for a new cable.

LITTLE SHOP OF HORRORS

BUT THAT CAN-DO ATTITUDE was in short supply at most repair shops. Our discovery shouldn't have come as a surprise: It's not as if poor service and repair are new. Welcome to America, where consumers find it easier to dump stuff than to get it fixed.

Half the techs at the 18 stores we visited let their imaginations run wild when diagnosing our disabled hard-drive cable problem. After jumping to wrong conclusions, they often doggedly pursued their assumptions without examining the system thoroughly enough to identify the real problem. Worse, in only 3 instances (2 Best Buy stores and 1 CompUSA outlet) did techs who misdiagnosed the problem eventually catch their mistake.

Without question, Circuit City took the prize as the least effective chain store we tested. Unlike Best Buy and CompUSA, the company doesn't fix systems at its stores at all; instead, it ships them to its centralized repair depots. But all four of our encounters with Circuit City service were failures. One store told us over the phone to bring the PC in, then refused to work on it once we arrived, claiming Circuit City did not repair systems purchased elsewhere. Another accepted the unit but then said it didn't have the information or parts to fix it. Our reporter pressed for details, and was repeatedly promised that a tech would contact him. But he heard nothing and eventually got his PC back unrepaired.

In Rhode Island, a Circuit City technician wrongly blamed our hard-disk problem on a flaky drive. But instead of compounding the error by trying to fix the machine, he advised us that the necessary repairs could cost hundreds of dollars and that it "wouldn't be fair" to us to have Circuit City do the job. (He suggested that we buy a drive at a swap meet and install it ourselves.) His Circuit City counterparts in Texas also mistakenly concluded we needed a new hard drive. We okayed that repair: a hefty $214 to install a piddling 3.2GB drive. When we got the machine home, we found a sticky note on the case reminding the technician to finish installing the software. Apparently, the tech had overlooked that memo—the new drive had DOS installed, but not Windows.

Our dealings with mom-and-pop stores truly disappointed us. Two years ago we surveyed only chains, and we wondered ▶

whether small shops, which have a solid reputation for service, could have done better. Nope. Five of the six flopped. And they seemed eager to stuff unneeded parts into our PCs. In all, two-thirds of the small stores said we needed a new motherboard or a new system.

Both the Rhode Island and North Carolina stores incorrectly deduced that our PCs had dead motherboards. The Rhode Island store ordered and installed a replacement. The other shop said it couldn't get a board to fit the Compaq's case and recommended rebuilding the PC with a combination of its own parts and new components. By the time we were through, the register rang up $295, and our desktop system had turned into a minitower.

In-Store Action

FIX IT OR BUY IT? We visited PC superstores with Dateline NBC and found that you can pay less for a new PC than for some repairs.

The New Jersey independent, which made a house call to our New York location, went further. The tech decided the problem lay in a bad motherboard and possibly a corrupted hard disk ▶

How the Stores Fared: No Big Winners

AS IN OUR LAST SURVEY, the one thing we can say about all PC repair options is that they're inconsistent. In many cases, it was all or nothing—we had either a terrific overall experience or a miserable one. Get references from friends or coworkers before surrendering your hardware and your money.

Service Problems: Faulty disk cable and disconnected CD audio cable

STORE	Overall	Diagnosis and repair	Efficiency	Helpfulness	Cost
Best Buy	**Inconsistent.** Two glowing A's, one C, and one ugly F.	**Inconsistent.** Two stores solved both problems; one solved the main problem; the fourth completely misdiagnosed the disk cable and missed the audio cable problem.	**Mostly quick-but.** Three got the PC back to us within 48 hours, but one diagnosis was wrong. And the fourth PC stayed in the shop for more than a month.	**Good.** All staffers were helpful and courteous in person, though some weren't too helpful over the phone.	**Good deal.** Fees ranged from $25 to $70; one store didn't charge us anything for the repair.
Circuit City	**Yikes!** All four stores flunked.	**Ouch.** One store refused to take our PC, two gave wrong diagnoses and couldn't fix the problems, and one installed a new disk. Only one solved the audio cable problem.	**Worst performer.** Turnaround time was at least ten days, perhaps because all PCs are sent to regional repair centers. (Does not apply to the store that refused to take the PC.)	**Mixed.** One tech was pleasant but wouldn't help; others were mostly friendly but didn't solve our problem.	**Varied.** From $0 to $20 for diagnosis, up to $214 for a new hard drive.
CompUSA	**Inconsistent.** Two B's, a C, and one F.	**Inconsistent.** Three stores solved the disk cable problem; two reconnected the audio cable, but one of those wanted to replace the motherboard.	**Mostly speedy.** Three returned the PC to us within 48 hours, but one of those misdiagnosed the problem; the last store took about ten days but solved the problem correctly. We had some problems getting through on the phone.	**Good.** All staffers were helpful and courteous, though one didn't ask enough questions.	**High minimum.** $100 a pop, but none charged for the hard drive cable. One quoted $630 for a motherboard replacement.
Independents	**Double yikes!** Only one A; the other five flunked.	**Bad news.** Only one store solved the drive cable problem. One in CA didn't diagnose either problem; the rest wanted to replace the motherboard.	**Acceptable.** The store that fixed the problem got the PC back to us within 48 hours. The others took at least four days but no more than ten.	**Mostly good.** Most store personnel were attentive and friendly, though one gave too little detail. One store offered grudging help at best.	**Wide range.** The store that gave up didn't charge us; another fixed the PC for $63; one billed us $300-plus for a motherboard replacement.

Phone Support Problem: Corrupted graphics driver

STORE	Overall	Accuracy and quality of advice	Accessibility	Helpfulness	Cost
Best Buy	**Extremes.** Two B's, two big F's.	**Toss-up.** The stores that agreed to help us solved the problem. The other two refused to help.	**Hold, please.** We were put on hold (over 10 minutes in some instances) or transferred multiple times.	**Toss-up.** The techs who agreed to help were friendly and polite. The ones who refused to help were also abrupt.	**Acceptable.** Two stores charged $25 and helped; the others didn't charge but didn't help.
Circuit City	**No phone support.**	n/a	n/a	n/a	n/a
CompUSA	**Inconsistent.** One A and one B; but another tanked, and a fourth was borderline.	**Inconsistent.** Two stores solved the problem. A third came up with the correct diagnosis but not the right steps for the fix.	**Hold, please.** We waited (up to 10 minutes) with all locations, and one made it hard to sign up for fee-based help.	**Good.** Most people we talked to were both knowledgeable and courteous.	**Acceptable.** Two stores charged $25; two gave free advice. Lesson: Try the local store first.
Independents	**Feast or famine.** Two A's, three failures, and one that didn't offer phone support.	**Toss-up.** The two that agreed to help us solved the problem. Of the others, one wouldn't help, and the other two gave us the wrong fix.	**Good.** In all but one case, we got through right away; in that one case, we waited less than 5 minutes.	**Good.** In all but one case (aside from the store that didn't offer phone support at all), the people we talked to were friendly and tried to help.	**Can't beat free.** None of our independents charged us for their advice.

n/a = not applicable

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(wrong); he said it would cost about $400 to get a new motherboard and fix our disk. Instead, he advised us to consider buying a new PC. His quote: $1000 or more for a system sans monitor—a price commensurate with the specs, but yikes!

Mildly good news: Unlike in our 1998 tests, no stores installed pricey parts without our prior go-ahead. Nor, as happened previously, did any techs falsely claim to have installed a new part. Give partial credit for this to our reporters, who usually asked to get the old parts back after the repair. You should always make that request, to ensure that you actually get new components.

WE'LL GET BACK TO YOU

WANT TO LIVE WITHOUT your business or home PC for days or weeks on end? Neither do we. That's why speed of repair is second only to a correct diagnosis in our book.

The roadrunner repair prize goes to CompUSA: Three of four locations we tested had the machine back to us within a day. True, that included the store that misdiagnosed the problem and advised us we needed a new motherboard—even the tech said the quoted $627 (from the store's price guide) was too high. The fourth CompUSA store took about ten days but fixed it right.

Best Buy was nearly as fast. Three Best Buy stores also turned our PC around in 24 hours or less—though only two fixed the cable problem correctly—but the fourth outlet needed a mind-numbing 36 days. We could have built a new PC in less time.

Almost all of the mom-and-pop stores were slow—half of them took seven days or longer to complete the job. The only independent store to return the PC in less than 48 hours was also the only one that passed the test.

At Circuit City, the wait was even longer. The three stores that took the problem on needed an average of 16 days to return the PC.

Worse, our reporters encountered some service procedures that were inefficient at best. CompUSA drew the ire of three of four reporters, who cited trouble reaching the service department and having to trot between service and checkout areas to identify stores with poor records.

The Fix Is In: Top Repair Tips

THESE EVERYDAY tips for smart computing can help you make future service trips less painful—or even avoid them.

1 Buy your PC with a three-year warranty: That will insure your PC for most of its useful life. If that level of protection doesn't come standard, as little as $100 can buy the additional years (see *Consumer Watch*, page 27, for more on long-term warranties). Where possible, get this coverage from your PC's manufacturer, so you always deal with the people who built your system—it's often cheaper, too.

2 Back up your data: Don't wait. Your PC's single most valuable thing is the data it contains—from bank and tax records, to your MP3 collection, to your sales contacts. Keep an updated backup on CD-RW, Zip disks, or some other storage medium.

3 Invest in a good utilities package: Norton SystemWorks and Ontrack's Fix-It, for example, cost about $50 and include not only system diagnostic tools, but often antivirus software and backup utilities (see www.pcworld.com/aug00/repair for details).

4 Keep your restore CD handy: When a problem hits, your system's restore CD, which has all the PC's original software settings, is the quickest way to get up and running again—especially if recently installed software triggered the problem.

5 Check out tech advice sites: Candidates include AskMe.com, NoWonder.com, and Service911.com. If your PC isn't completely inoperable, entering a chat room with techs and fellow PC users or dashing off an e-mail that clearly describes the problem will often net you a fast, accurate—and usually free—fix.

6 Choose a shop carefully: If the worst does happen, call several shops for facts on repair procedures. Is there a diagnosis fee? If so, is it applied toward the repair cost? What is the hourly fee or flat rate for labor? Is the work guaranteed? If so, for how long? What's the expected turnaround time? Finally, check with the Better Business Bureau to

7 Get the facts straight: Before you head out to the store, list your PC's symptoms, including the precise wording of error messages. Take any CD-ROMs or floppies (like the restore disk) that came with the system; the store's technician may request them.

8 Have open communication: At the shop, give service reps full details about the problem. Ask the rep to call for your okay before performing services that will cost more than the fee (if any) you pay at drop-off.

9 Check the math: When you pick up the PC, review what was done and its cost. Ask for a written report, with specifics on warranties for parts and labor.

10 Test the PC right away: A shoddy repair job may introduce problems, so check your PC as soon as you return to your office. Reconnect add-ons such as your printer and verify that everything works properly. Report problems immediately.

IF YOU WANT TO DISPOSE of your old PC, check the PEP National Directory of Computer Recycling Programs (www.microweb.com/pepsite/Recycle/recycle_index.html). You'll find info at the state, national, and international level about organizations that will take your PC to a new home (and get you a tax write-off).

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prepay for the repair. The Rhode Island Best Buy that held on to our PC for over a month kept us poorly informed, too, telling us little of substance when we called for status updates. And two promised callbacks from that store never came.

Most independent shops communicated well. But a California store didn't call us back; another showed scant interest in doing the repair. "They seemed to be put out at having to help a customer," said our Texas reporter, who was told that fixing the PC might take a week, despite the store's advertised promise of same-day service.

In-Store Action

LEFT: One store transplanted parts from our old PC onto a new motherboard in a new case. Our reporter made sure he got his original parts back.

BELOW: Best Buy is equipping stores for on-the-spot diagnostics, by setting up monitors right at service and repair counters.

PHONE HELP: NOT MUCH BETTER

IF NO SERVICE CENTER or mom-and-pop store is nearby, you can try punching numbers on the phone. Phone support is worth considering in other instances, too, since a good technician should be able to grasp the gist of the problem and walk you through a fix. If the fix works, the typical cost for fee-based phone support—around $25 per incident—is a good deal. But only 6 of the 13 stores that offered tech support by phone provided good service for our video-driver problem.

One store "seemed to be put out at having to help a customer," said our reporter.

The brightest spot was CompUSA, whose techs nailed the problem two out of four times. A third made the right call—and provided the diagnosis free—but failed to walk us through a correct fix. Even at CompUSA, however, we ran into lousy advice. One of its techs told us, "I'm 99 percent certain you'll have to reinstall Windows." If that didn't solve the problem, he said we'd need a new motherboard. Talk about jumping to conclusions.

Even more disturbing, some phone techs simply refused to lend a hand. That reaction was understandable at Circuit City, since its policy is not to work the phones. But how do you explain the response at Best Buy? Though the voice menu at that company's toll-free number clearly mentions a $25 per incident support option, its reps rebuffed us repeatedly, claiming no such support was available. Our reporters persevered, however, and two of the four eventually reached a technician and got help.

Not surprisingly, many independent mom-and-pop shops can't afford to provide full-fledged phone support, and as a result they decline to offer any. But in the five cases where we managed to enlist small-shop technicians' guidance over the phone, only two of the advisors solved the problem correctly.

All told, we had somewhat better results with phone support than with drop-off service. But the experience still left us disheartened. If your tech support encounters are like ours, you may need to assert yourself somewhat aggressively just to convince a service department to tackle your problem. And once you do convince someone to help you troubleshoot your cranky computer, you may end up wishing you hadn't bothered.

THE STORES RESPOND

WHAT EXPLAINS OUR RESULTS? Once all 18 PCs were back to us, we sought responses from each chain and independent shop to comment on our experiences.

Circuit City spokesperson Morgan Stewart clarified the chain's position on repairs, stating that Circuit City will repair products purchased elsewhere, as long as they're out of warranty and Circuit City carries the brand (this matches the policy at the company's Web site). He said store staffers who told us otherwise must have misspoken. Stewart said that our test presented an unusual, hard-to-diagnose situation, and he noted that Circuit City's surveys of 30,000 customers show high satisfaction with purchase and repair experiences (the latter where applicable). He also noted that all of the chain's technicians have A+ certifi- ▶

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cation (a Computing Technology Industry Association rating).

Representatives of Best Buy and CompUSA, which mixed repair successes with jarring failures, conceded the problems and predicted service would improve with time. Lowell Peters, senior vice president of services for Best Buy, says the chain recently installed monitors and utilities at store counters for on-the-spot diagnosis. (This setup let the Texas store fix our hard-disk cable problem in just 35 minutes.) The chain has installed a system for relaying current repair status to customers. Peters explains that not all Best Buy personnel have been fully trained on the new repair procedures: "It definitely must get smoother," he admits.

At CompUSA, recent service changes include mandatory technical certification for repair staffers and compensation incentives based on customer satisfaction, according to Tony Weiss, executive vice president of business solutions. Though one store misdiagnosed our problem as a defective motherboard, Weiss expressed confidence that the mistake would have been caught and the problem fixed correctly if we had gone ahead with the repair, since the problem would have persisted even with a new board. Weiss agrees that shuttling customers between the service center and the checkout counter to pay for a repair is inconvenient; the company hopes to eliminate the need for such footwork sometime this fall. CompUSA is also adding a more thorough check of drive cables as part of its diagnostic process.

And the independents? Like Circuit City's Stewart, some small-store managers said our cable problem was out of the ordinary and therefore unusually difficult to diagnose. But the ones that got it wrong didn't dispute their misdiagnosis. For example, an owner of the North Carolina store, who didn't personally work on our PC, said the hard-disk cable "would have been the last thing I'd have checked, but I would have checked it."

Best Buy acknowledges new repair procedures "definitely must get smoother."

BEWARE: BONEHEAD TECH INSIDE

OUR PC REPAIR misadventures trained us to spot some common characteristics of technicians who did more damage than good—and the mishaps helped us dispel some myths about reliable indicators of good service. It wouldn't hurt to keep these life lessons in mind if you want to avoid your own repair disasters:

Dangerous Tech #1: The Leaper Many technicians made snap judgments almost as soon as we started talking. They were almost always wrong. If the technician claims to positively know what's amiss before opening the case, proceed with caution.

Dangerous Tech #2: The Parts Peddler Technicians who recommended pricey repairs that involved replacing major parts were way off base. Be skeptical of any tech who claims that the only way to fix the trouble is to swap out major components.

Myth #1: A good attitude means good service. In our drop-in tests, we found no real correlation between Helpfulness scores—where we gauged the techs' courteousness and ability to communicate with us—and successful repairs.

Myth #2: A short wait means a quick fix. A short wait when you're calling for help doesn't mean you'll get the right answer. Of the eight tech support staffers who answered our phone calls after an on-hold wait of less than 5 minutes, only two solved our video driver problem. We had a higher success rate—three out of three—when we waited 10 or more minutes to get through.

WINNING MOVES

CLEARLY, HAULING YOUR COMPUTER into a shop is risky. Our advice: Buy a computer with a strong manufacturer's warranty, so you can delay having to worry about out-of-warranty repairs. If you need to find a repair shop, don't pick one at random. Instead, turn to someone you know or ask for recommendations from friends who rely on computers in their businesses.

With the right knowledge and tools, you can fix or avoid many PC problems yourself. Equip your system with diagnostic software (see our suggestions at www/pcworld.com/augoo/repair), use online tech support sites, including those hosted by your PC's maker, and learn basic troubleshooting skills.

In other words, the surest way to win at repair roulette is to avoid spinning the wheel at all. But if you must head to the service shop, reach for your rabbit's foot. And watch your wallet.

Gregg Keizer is a frequent contributor to PC World. ■

The Price You Pay

RESOLVING SEEMINGLY simple PC problems can cost hundreds of dollars. For a PC over three years old, we recommend spending a maximum of $300 on repairs—remember that new, better-equipped computers cost as little as $400. For PCs between one and three years old, budget up to $500 for repairs.

Labor costs vary widely, so get quotes from several shops. Most will charge a diagnosis fee of $20 to $60, though some shops provide this service free. Hourly labor rates generally range from $50 to $90; some stores charge a flat labor fee of $100 to $125—a good option if you suspect a serious problem. Below are average prices for parts that may be replaced during a repair.

PC COMPONENT	Type	Price
Motherboard	Socket 7 without RAM / Pentium III-500 with 128MB of RAM	$40/$450
Hard drive	6.4GB IDE hard drive / 30.7GB IDE hard drive	$80/$230
Graphics card	PCI / AGP	$95/$250
Sound card	ISA / PCI	$10/$100
CD-ROM drive	IDE CD-ROM drive	$45 to $120
Floppy drive	3.5-inch, 1.44MB	$10 to $30
RAM	32MB DIMM or SIMM	$35
Power supply	250W	$35 to $100
Drive cable	IDE	$5 to $16

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E-QUOTE: pcw08s33

QUANTEX SM800s
Cutting-Edge Performance Desktop

Intel® Pentium® III Processor 800MHz
128MB PC133 SDRAM Memory
40GB 7200rpm Ultra ATA-66 Hard Drive
17" High-Resolution Digital Monitor
nVidia GeForce 256 Graphics w/32MB, TV-Out
12x Max Variable Speed DVD-ROM Drive
10/100 PCI Network Card—Broadband Ready
Sound Blaster AudioPCI 128 Sound
Altec Lansing ACS-33 Speakers w/Subwoofer
Microsoft Office 2000 SBE
3-Year Limited Warranty
One-Year Limited On-Site Service
Upgrade to nVidia GeForce2 GTS 32MB DDR for $149

$1779
Business lease:$65/Mo., 36 Mos.
E-QUOTE: pcw08s21

QUANTEX M800t
Affordable Desktop Solution

Intel® Pentium® III Processor 800MHz
128MB High-Performance SDRAM Memory
20GB Ultra ATA-66 Hard Drive
17" High-Resolution Digital Monitor
Intel 2D/3D Graphics Accelerator
12x Max Variable Speed DVD-ROM Drive
Dynamic Wavetable Stereo Sound
3-Piece Stereo Speakers w/Subwoofer
Corel WordPerfect Office 2000
3-Year Limited Warranty
One-Year Limited On-Site Service

$1299
Business lease:$47/Mo., 36 Mos.
E-QUOTE: pcw08m40

With Quantex you get it all–proven performance, award-winning service and reliability, and a truly amazing value. Our SM-Series Desktops incorporate the latest technologies in a box designed to maximize your overall experience (and save you a few bucks). For one, they're powered by the fastest Intel® Pentium® III processors! Combine that with a whole host of other top-notch name-brand components and you've got state-of-the-art performance even when running the most intense multimedia applications, games, DVD, the Internet and more. Get a Quantex and you're in for the most dazzling PC experience yet.

Quantex SM933x Performance Desktop Pictured

SM-Series **BEST BUY**

Cutting-Edge Performance Desktop

Intel® Pentium® III Processor 733MHz
128MB PC133 SDRAM Memory
30GB 7200rpm Ultra ATA-66 Hard Drive
17" High-Resolution Digital Monitor
nVidia TNT2 AGP Graphics w/32MB, TV-Out
56K V.90 Internet Fax/Modem[1]
10/100 PCI Network Card—Broadband Ready
12x Max Variable Speed DVD-ROM Drive
Internal Zip Drive
Sound Blaster AudioPCI 128 Sound
Altec Lansing ACS-21W Speakers
Corel WordPerfect Office 2000
3-Year Limited Warranty
One-Year Limited On-Site Service

$1499

Business lease: $54/Mo., 36 Mos.
QUOTE: pcw08s13

QUANTEX M667v

Affordable Desktop Solution

Intel® Pentium® III Processor 667MHz
64MB High-Performance SDRAM Memory
10GB Ultra ATA-66 Hard Drive
17" High-Resolution Digital Monitor
Intel 2D/3D Graphics Accelerator
12x Max Variable Speed DVD-ROM Drive
Dynamic Wavetable Stereo Sound
3-Piece Stereo Speakers w/Subwoofer
Corel WordPerfect Office 2000
3-Year Limited Warranty
One-Year Limited On-Site Service
Upgrade to 128MB SDRAM for $99

$1079

Business lease:$39/Mo., 36 Mos.
QUOTE: pcw08m21

QUANTEX M566c

Affordable Desktop Solution

Intel® Celeron™ Processor 566MHz
64MB High-Performance SDRAM Memory
10GB Ultra ATA-66 Hard Drive
17" High-Resolution Digital Monitor
Intel 2D/3D Graphics Accelerator
48x Max Variable Speed CD-ROM Drive
Dynamic Wavetable Stereo Sound, Speakers
Corel WordPerfect Office 2000
3-Year Limited Warranty
One-Year Limited On-Site Service
Upgrade to Intel Celeron Processor 600MHz for $50

$899

QUOTE: pcw08m04

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[Solid Specs

W-Series Notebook Pictured w/Optional Mini-Docking Station

"If you need a laptop that can handle any task you might throw at it, and can serve as an excellent desktop replacement, you'll find the [W-Series] an outstanding value." *Laptop Buyers Guide and Handbook*, Best Buy Award, 04/00

Standard Notebook Features: 3.5" 1.44MB Floppy Drive, Smart Lithium Ion Battery, USB/Fast IR Ports, Personal Touchpad, 3-Year Limited Warranty on CPU & Memory, 1-Year Parts and Labor Limited Warranty on all other components, ***Toll-Free Technical Support***

Standard Desktop Features: Floppy Drive, 2 USB Ports, ATX Mid-Tower Case, Chassis-lock, Removable Hard Drive Chassis & Power Supply, 104-Key Keyboard, MS Mouse, ***Toll-Free Technical Support***

intel inside
pentium® III

QUANTEX W-1500
Desktop Replacement Notebook

Pentium® III Processor 700MHz featuring Intel® SpeedStep™ Technology
15" XGA TFT Active Matrix Display
128MB PC100 SDRAM Memory
12GB Ultra ATA Hard Drive
Modular 8x Max Variable Speed DVD-ROM Drive
ATI Mobility P Graphics w/8MB, **TV-Out**
Quantex **Deluxe Carrying Case** Included!
MS Windows 2000 Professional, Corel Office 2000
Upgrade to Microsoft Office 2000 SBE for $129

$2599

Business lease:$94/Mo., 36 Mos.
e-QUOTE: pcw08w39

QUANTEX W-1400
Desktop Replacement Notebook

Pentium® III Processor 650MHz featuring Intel® SpeedStep™ Technology
14.1" XGA TFT Active Matrix Display
64MB PC100 SDRAM Memory
12GB Ultra ATA Hard Drive
Modular 8x Max Variable Speed DVD-ROM Drive
ATI Mobility P Graphics w/8MB, **TV-Out**
Quantex **Deluxe Carrying Case** Included!
MS Windows 98 Second Edition, Corel Office 2000
Upgrade to Microsoft Office 2000 SBE for $129

$2199

Business lease:$80/Mo., 36 Mos.
e-QUOTE: pcw08w01

QUANTEX W-1400
Desktop Replacement Notebook

Pentium® III Processor 600MHz featuring Intel® SpeedStep™ Technology
14.1" XGA TFT Active Matrix Display
64MB PC100 SDRAM Memory
6GB Ultra ATA Hard Drive
Modular 24x Max Variable Speed CD-ROM Drive
ATI Mobility P Graphics w/8MB, **TV-Out**
Quantex Carrying Case Included!
MS Windows 98 Second Edition, Corel Office 2000
Upgrade to Microsoft Office 2000 SBE for $129

$1999

Business lease:$73/Mo., 36 Mos.
e-QUOTE: pcw08w18

Peripheral Upgrades *W-Series Mini-Docking Station...add $179, Smart Lithium Ion Battery...$119, PCMCIA Network Card...$129, Quantex Deluxe Carrying Case...$89, Targus Defcon1 Security Lock...$49, Canon BJC-85 Portable Color Printer...$299, APC Notebook Pro Surge Protector...$29*

Spec for spec, Quantex Notebooks and Business Desktops are configured for success at prices that are much less than you'd expect. Plug a Quantex W-Series Desktop Replacement Notebook into our mini-docking station and utilize all the power and capabilities of a desktop—with the added bonus of taking it with you. Looking to do e-business on a budget? Quantex SB-Series Business Desktops offer a reliable and stable platform at a sensible price. In addition, both series feature Intel® Pentium® III processors and Windows 2000 Professional, which offers a 99.95% uptime rate. Extreme reliability, proven features and a great price. That's everything your business needs to move ahead in the e-business age.

Quantex W-Series Notebook Pictured w/Optional Mini-Docking Station

W-Series BEST BUY

Desktop Replacement Notebook

New Pentium® III Processor 750MHz featuring Intel® SpeedStep™ Technology
15" XGA TFT Active Matrix Display
128MB PC100 SDRAM Memory
18GB Ultra ATA Hard Drive
Modular 8x Max Variable Speed DVD-ROM Drive
ATI Mobility P Graphics w/8MB, TV-Out
Quantex Deluxe Carrying Case Included!
Microsoft Windows 2000 Professional
Microsoft Office 2000 SBE

$2999

Business lease: $109/Mo., 36 Mos.
Q-QUOTE: pcw08w04

QUANTEX SB700t
Sensible Business Desktop

Intel® Pentium® III Processor 700MHz
128MB High-Performance SDRAM Memory
15GB 7200rpm Ultra ATA Hard Drive
17" High-Resolution Digital Monitor
nVidia TNT2 Vanta AGP Graphics, 16MB
48x Max Variable Speed CD-ROM Drive
Intel 10/100 PCI Fast Ethernet Controller w/WOL
Advanced Creative Labs Sound
Microsoft Windows 2000 Professional
3-Year Limited Warranty
One-Year Limited On-Site Service
Upgrade to nVidia TNT2 w/32MB, TV-Out for $59

$1299

Business lease:$47/Mo., 36 Mos.
Q-QUOTE: pcw08b34

QUANTEX SB566c
Sensible Business Desktop

Intel® Celeron™ Processor 566MHz
64MB High-Performance SDRAM Memory
10GB Ultra ATA-66 Hard Drive
15" Digital Monitor w/On-Screen Display
Intel 2D/3D Graphics Accelerator
48x Max Variable Speed CD-ROM Drive
10/100 PCI Fast Ethernet Controller w/RJ-45
Dynamic Wavetable Stereo Sound
Microsoft Windows 98 Second Edition
3-Year Limited Warranty
One-Year Limited On-Site Service
Upgrade to MS Windows 2000 Professional for $79

$799

Q-QUOTE: pcw08b10

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There's never been a more affordable, no-fuss solution for businesses looking to deploy new e-business servers. Rack-mountable with innovative "headless" installation (no VGA, keyboard or monitor necessary) for quick, high volume deployment, new Quantex IS-Series Servers come bundled with the rock solid Red Hat Linux operating system and also offer robust remote management capabilities. They feature industry-leading hardware components built on superior open platforms based on Intel Architecture for seamless integration into your current network. And with innovative new 1U and 2U Rack Dense form factors, Quantex IS-Series Servers will easily grow with your business.

Check out our full line of servers and appliances at www.quantex.com

QUANTEX QX4100
Reliable E-Business Server

- Intel® Pentium® III Processor 750MHz
- Dual-Processor Upgradable
- Tower Case (5U Rack-Mount Upgrade Available)
- 128MB ECC SDRAM (2GB Max)
- 9GB Ultra2/LVD SCSI Drive (360GB Max.)
- Intel EtherExpress Pro 100 Ethernet Adapter
- Dual Channel Ultra2/LVD SCSI Controller
- 3.5" 1.44MB Floppy Drive
- 48X Max Variable Speed CD-ROM
- Dual Peer PCI Buses; 6PCI, 1 ISA Slot
- 5 Hot-Swap RAID Capable Drive Bays (upgradable to 10)
- 300 Watt Power Supply
- *Add MS Windows 2000 server for $799*

$1999

Business lease starting at: $73/Mo., 36 Mos.

QUOTE: pcw08q52

QUANTEX IS2000
2U Scalable Internet Server

- Intel® Pentium® III Processor 700MHz
- Dual-Processor Upgradable
- Compact 2U Rack-Server Design
- 128MB ECC SDRAM (2GB Max)
- 9GB Ultra2/LVD SCSI Drive (220GB Max.)
- Dual Intel Pro/100 NICs w/Adapter Fault Tolerance and Adaptive Load Balancing
- Ultra2/LVD SCSI Controller
- 3.5" 1.44MB Floppy Drive & Slimline CD-ROM
- Two Full-Size 32-bit PCI Slots
- 4 Hot-Swap RAID Capable Drive Bays
- 275 Watt Power Supply
- Red Hat Linux w/Apache Web Server

$2599

Business lease starting at: $94/Mo., 36 Mos.

QUOTE: pcw08q70

QUANTEX IS1000
1U High-Density Internet Server

- Intel® Pentium® III Processor 700MHz
- Headless Installation for Mass Server Deployment
- Compact 1U Rack-Server Design
- 128MB ECC SDRAM (1GB Max)
- 10GB 7200rpm Ultra ATA 66 Hard Drive
- Dual Intel Pro/100 NICs w/Adapter Fault Tolerance and Adaptive Load Balancing
- 3.5" 1.44MB Floppy Drive
- Two 32-bit PCI Slots (1 Low-Profile)
- Single Screw Access to Top Cover; Tool-Less Access to Hard Drives
- 125 Watt Low-Consumption Power Supply
- Red Hat Linux w/Apache Web Server

$1899

Business lease: $69/Mo., 36 Mos.

QUOTE: pcw08q62

intel inside pentium® III

Standard Features: ISC Management Console, Emergency Management Port, 3-Yr. Limited Warranty, One Year Limited On-Site Service, Toll-Free Dedicated Hardware Technical Support

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By Richard Jantz

Fantastic Flatbeds

This year's color scanners are faster and offer sharper image quality. We review 18 models for your office or home.

YOU GET WHAT YOU PAY FOR. At least that's what scanner vendors tell you when you belly up to the glass counter to buy one. Over the past couple of years, scanners haven't dropped much in price, but they now include many capabilities and features that you once paid big bucks for.

So the question lingers: If you pay the same amount of money as before, are you buying more than you need? Scanner makers continue to promote higher optical resolution and enhanced color depth, ▶

PHOTOGRAPHS BY JOHN GREENLEIGH

Best Buys

OUR BEST BUY in the SOHO category goes to the **Epson Perfection 1200S** (pictured left). At $299, Epson's champ produces sparkling scans; packs some great features, including an impressive 1200-dpi resolution; and provides a meaty software bundle. For its highly competitive price, legal-size scan bed, and excellent color scans, the $389 **Microtek ScanMaker X12USL** earns our corporate Best Buy. Don't miss the optional automatic document feeder and transparency adapter, which Microtek sells for an additional $149 and $79, respectively.

even as they promise faster overall performance. We found, however, that resolutions greater than 600 dpi offer only minimal improvement over lower resolutions unless you are scanning from a negative or a filmstrip, or are greatly enlarging a small portion of an image. And because many image-editing applications permit only minimal adjustments in anything beyond 24-bit mode, the greater color depth that new scanners promise remains largely unrealized. Moreover, since higher resolutions entail longer processing times and larger file sizes, you may find that one cost of reaping higher-quality images is an unusually large outlay of patience.

THE INSIDE SCOOP

WE ROUNDED UP 18 flatbed scanners, ranging in price from $90 to nearly $900. Though most of the manufacturers represented in last year's scanner roundup are back (see "A Scanner for All Reasons," www.pcworld.com/apr99/scanners), some companies, including Memorex and Storm Technology, have exited the highly competitive scanner market. We sorted scanners by price and function into two categories: SOHO scanners, which are intended for home and small office users who scan more photos than documents; and corporate models, which are designed for business users who scan multiple pages or filmstrips and require accuracy. Unlike the typical SOHO scanner, many corporate units come bundled with optional accessories and tend to emphasize speed, sturdiness, and larger scan beds.

The PC World Test Center measured each scanner's speed and image quality on a 550-MHz Pentium III PC running Windows 98, with 128MB of SDRAM. To measure reproduction quality, our panel of judges examined four images from each scanner in blind taste tests. We scanned a color photo using the highest optical resolution available from each scanner. We also scanned the same photo

FLATBED SCANNERS

			Scorecard		Features			
	SMALL OFFICE/HOME OFFICE	Street price (5/23/00)	Features	Support policies/ quality	Connection type	Max. optical/ enhanced res. (dpi)	Maximum color depth (bits)	Bundled software
1	**Epson Perfection 1200S** 800/463-7766 www.epson.com	$299 [2]	Good	Fair/ Good	SCSI	1200 x 2400/9600	36	Adobe PhotoDeluxe Business Edition 1, ArcSoft PhotoPrinter, Broderbund PrintShop PressWriter, Presto PageManager 4.2
2	**Visioneer OneTouch 8600** 888/229-4172 www.visioneer.com	$200	Good	Fair/ Fair	USB/ Parallel [3]	600 x 1200/ 9600	36	MGI PhotoSuite II SE, PaperPort Deluxe 6.1, PictureWorks Photo-Enhancer, WebPublisher Link, Xerox TextBridge Pro 8
3	**Acer 640U** 800/733-2237 www.acerperipherals.com	$90	Limited	Excellent/ Good	USB	600 x 1200/ 19200	48	ABBYY FineReader 4 Sprint, Kai Photo Soap 2, Photo Express SE 3, Presto ImageFolio LE 4.1.5, Presto PageManager Deluxe
4	**Agfa SnapScan Touch** 888/281-2302 www.agfahome.com	$99	Limited	Good/ Good	USB	600 x 1200/ 9600	36	Caere OmniPage LE 5.1, Caere PageKeeper, Corel Print House Magic
5	**Umax Astra 2200** 800/562-0311 www.umax.com	$199	Good	Fair/ Good	USB/ SCSI [3]	600 x 1200/ 9600	42	Adobe Photoshop 5 LE, Bizcard 3, Caere OmniPage LE 5, Macromedia Fireworks 2, NetObjects Fusion 4, Presto PageManager 4.2
6	**Umax Astra 4000U** 800/562-0311 www.umax.com	$349	Good	Fair/ Good	USB	1200 x 2400/9600	42	Adobe Photoshop 5 LE, Caere OmniPage LE 5, BizCard 3, Presto PageManager 4.2
7	**Canon CanoScan FB 630Ui** 800/652-2666 www.ccsi.canon.com	$129	Limited	Fair/ Good	USB	600 x 1200/ 9600	36	Canon Photo 1.5, Xerox TextBridge Pro 8
	CORPORATE							
1	**Microtek ScanMaker X12USL** 800/654-4160 www.microtekusa.com	$389 [2]	Excellent	Good/ Good	USB/ SCSI-2 [3]	1200 x 2400/9600	42	Adobe Photoshop 5 LE, Caere OmniPage LE 5.1, Kodak Digital Science Color Management, PageKeeper Standard 3, Trellix Web 2.5
2	**Canon CanoScan FB 1200S** 800/652-2666 www.ccsi.canon.com	$299 [2]	Fair	Fair/ Good	SCSI	1200 x 1200/ 9600	36	Adobe Photoshop 5 LE, Xerox TextBridge Plus
3	**Epson Expression 1600 Artist** 800/463-7766 www.epson.com	$899	Excellent	Fair/ Good	USB/ SCSI [3]	1600 x 3200/12800	36	Adobe Photoshop 5 LE, MonacoEZcolor 1.5, Presto PageManager 4.2, Xerox TextBridge Classic OCR

Best Buy

[1] For an explanation of throughput calculation, see page xxx under the heading "Scan Speed."

[2] Priced with SCSI adapter.

[3] Tested with USB interface.

image at 75 dpi (an appropriate resolution for Web posting), a gray-scale image at 600 dpi, and line art at 300 dpi. Our testers viewed the 75-dpi scans side by side on color-calibrated screens, and compared prints made by an HP 970Cxi ink jet printer for the maximum-dpi scan and by the HP Color LaserJet 8500N for the other scans. We also measured each unit's scanning speed and gauged its ease of use, features, and software, and its vendor's service and support.

We put together a chart of the top seven SOHO units and the top three corporate models, including one Best Buy for budget-conscious SOHO users and another for performance-driven corporate types.

For both image quality and speed, our SOHO Best Buy, the $299 Epson Perfection 1200S can't be beat. This 36-bit-color unit produces handsome scans and has great features like 1200-dpi resolution, a blazingly fast SCSI interface, and an ample bundle of useful software.

Another advantage: With the Perfection 1200S, you can add attachments to suit your particular work requirements: a $99 adapter for scanning transparent media such as 35mm slides and film negatives (up to 4 by 5 inches); and a $199 automatic document feeder for OCR scanning of multiple-page documents.

Our Best Buy corporate machine produces top-quality scans and handles a high volume of work. The $389 Microtek ScanMaker X12USL, a 1200-dpi, 42-bit color scanner, has a dual SCSI-2 and USB interface and a legal-size scan bed. The ScanMaker X12 bundles excellent scanning software, including two task-based control panels—one for novices, and one for advanced users. Microtek also sells add-ons: a $150 document feeder and a $79 transparency unit for scanning 35mm slides and film (up to 5 by 6 inches).

Last year's cutting-edge models boasted 36-bit color depth, but they've given way to today's 42- and even 48-bit units.

SCANNING'S BIG PICTURE

A FRESH CROP OF 1200-dpi, 42-bit models have superseded many of last year's 600- and 300-dpi, 36-bit color scanners. In our April 1999 roundup, none of the scanners we reviewed offered true optical resolution of more than 600 dpi. This year, seven units feature 1200 dpi, and one corporate chart maker goes as high as 1600 dpi. The higher the resolution, the more detail a scanner can capture, which is especially important when you want to enlarge small originals such as 35mm slides or scan line art.

Last year's cutting-edge models boasted 36-bit color depth, but they've given way to today's 42- and even 48-bit units. Color depth represents the ability of a scanner's imaging sensor (CCD or CIS) to capture accurate color; the more bits used for color depth, the higher the number of possible colors a scanner can read. To achieve higher depth, scanners use either more sophisticated (and more expensive) hardware-based analog-to-digital converters or cheaper software interpolation. With interpolation, the color depth of a typical 36-bit image will bump to 42 or 48 bits.

Of the scanners on our chart, only the Microtek ScanMaker X12USL uses hardware to generate higher color depth. In contrast, the Acer 640U and the Umax ▶

Scan quality				Scan speed				Service and support	
Maximum-dpi color print output score	75-dpi color on-screen output score	600-dpi gray-scale print output score	300-dpi line-art print output score	Color scanning speed at maximum dpi (seconds)/ throughput [1] (kbps)	75-dpi color scanning speed (seconds)	600-dpi gray-scale scanning speed (seconds)	300-dpi line-art scanning speed (seconds)	Parts/labor warranty (years)	Tech support (hours/days, charge)
Good	Excellent	Fair	Fair	249/577	15	38	17	1/1	12/5, toll call
Good	Fair	Good	Fair	129/287	19	44	35	1/1	11/5, toll call
Limited	Good	Poor	Fair	121/303	25	47	40	1/1	24/7, toll-free
Limited	Good	Good	Good	78/463	23	79	48	1/1	12/5, toll-free
Good	Fair	Good	Fair	115/323	72	66	61	1/1	14/6 [4], toll call
Good	Fair	Good	Fair	461/321	48	77	65	1/1	14/6 [4], toll call
Limited	Good	Fair	Fair	124/298	61	95	79	1/1	14/6 [4], toll call
Excellent	Good	Fair	Good	438/345	28	59	31	1/1	12/5, toll call
Fair	Good	Good	Fair	373/393	38	33	30	1/1	14/6 [4], toll call
Excellent	Good	Good	Fair	495/529	13	46	18	1/1	12/5, toll call

[4] Weekend hours vary. [5] Tested with SCSI interface.

Astra 2200 and 4000U use software interpolation to create higher-bit images. Unfortunately, scanners that use software interpolation in place of more-powerful hardware often produce inferior results—and more slowly at that—simply because interpolation adds middle-value information that did not exist in the original image. Note: For our scan quality tests, we decided not to include higher color-bit images because we wanted to use each scanner's default settings; these settings typically create 24-bit images.

To complicate matters, the jury remains undecided about the practical benefits offered by increased color depth. Most higher-color-bit models don't have bundled image editing software that can thoroughly edit anything beyond a 24-bit-color file (that is, 8 bits per color channel). And in most cases, only graphics pros and scanner vets will prefer working with space-hogging high-color-bit images anyway. Of course, if you store a high-color-bit scan, you can revert to the original—albeit large and uncorrected—image data for future work. The bottom line: a 36-bit scanner that ultimately outputs a 24-bit color file will handle most businesses' everyday scanning needs.

Most higher-color-bit models don't have bundled image editing software for editing more than a 24-bit-color file (or 8 bits per color channel).

SCANNING THE HORIZON

ONE OF THE MOST visible changes in scanners over the last year involves port architecture. Several units, including our corporate Best Buy, the Microtek ScanMaker X12USL, now come with dual interfaces; this arrangement gives users various connectivity options such as USB and SCSI or USB and parallel. Currently, three of the eight scanners Microtek sells offer dual-port circuitry, and the company anticipates offering consumers USB and IEEE 1394 (also known as FireWire) duality soon. You can expect other vendors to follow suit before long. This type of integration allows users to graduate to faster technology without overhauling or replacing their equipment.

IEEE 1394 scanners first hit the market earlier this year as an interface option for high-end models. We didn't test any IEEE 1394 scanners for this review since they tend to be extremely expensive ($999 and higher); however, *PC World* did look at two IEEE 1394 models—Epson's Expression 1600 Pro FireWire and Umax's PowerLook 1100—in our April 2000 issue, and we reported mixed results when comparing their output to that of a SCSI-2 scanner (see "Two Ports in a Storm," www.pcworld.com/apro0/ports).

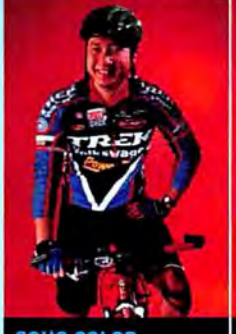
Finally, don't plan on watching the prices of 1200- and 1600-dpi scanners drop any lower in the near future. According to IDC research, they've hit rock bottom, and the trend going forward will be for vendors to add features but stick to current price levels. Still, this could mean better prices on conventional, competitively priced 600-dpi scanners.

Picks and Pans for Colorful Scans

Test results reveal marked differences in scan quality. We picked the best and worst from the SOHO and Corporate charts.

ORIGINAL PRINT

BEST SCAN PERFORMANCE



SOHO COLOR
Acer 640U

CORPORATE COLOR
Canon CanoScan FB 1200S

ACER'S 640U WINS the SOHO color test with fine color contrast, lettering, and range of red hues. Though the 640U delivers the best color performance, its black-and-white scans were somewhat disappointing. On the corporate side, Canon's CanoScan FB 1200S lettering lacks the Acer's detail, but the 1200S came through with splendid color range in both skin tones and red hues.

WORST SCAN PERFORMANCE

SOHO COLOR
Visioneer OneTouch 8100

CORPORATE COLOR
Acer ScanPremio ST

BRINGING UP THE REAR were Visioneer's $180 SOHO model, the OneTouch 8100; and Acer's $799 corporate contender, the ScanPremio ST. The OneTouch 8100's image looked washed out and grainy, while the ScanPremio ST displayed a dark, muted image. Furthermore, both images misrepresented the red spectrum, producing colors that appeared more brown than red.

Ease of Use

BEST SOHO: Umax Astra 2200
BEST CORPORATE: Microtek ScanMaker X12USL

PUSH BUTTONS MAKE WORKING ON THE FLY easier than ever by helping jump-start tasks like scanning, copying, faxing, and e-mailing documents.

PRESTO CHANGE-O: The $99, USB, Agfa SnapScan Touch (right), displays a medley of push buttons for frequent tasks.

SEVEN-TOUCH WONDER: The Visioneer $200 OneTouch 8600 augments its standard buttons with a customizable one. The unit has a dual USB and parallel-port interface, too.

OF THE 18 MODELS we reviewed, 10 came with easy-to-install USB connections. The other eight carried SCSI connections, which are generally a little more labor-intensive to set up.

Many models bundle a card or fold-out chart that outlines the installation process at a glance. The best printed manuals came with Epson's Perfection 1200S and Expression 1600 Artist; but Acer, Canon, Microtek, and Umax all provide thorough written documentation and online manuals with their units. But some manufacturers now offer only electronic user manuals. Of those, HP provided the best electronic versions accompanying its ScanJets, including informative short videos that outline installation procedures.

If you're a small-business or home user and you like the idea of push-button scanning, we have good news. Nearly all the SOHO scanners on our Top 10 list provide at least one button to start the scanning process. Both the Agfa SnapScan Touch and the Umax Astra 2200 have buttons that launch an application or utility related to a specific task, while the seven-button Visioneer OneTouch 8600 adds a customizable button to the mix.

Another feature that makes matters easier is the TWAIN module, which allows a scanner to communicate with imaging software. All of the scanners include drivers that are capable of importing scans into such TWAIN-compliant software as Adobe PhotoDeluxe or Xerox TextBridge, where you can edit those scans.

Top-quality scanning software includes automated controls to expand configuration options for preview scans. These may allow you to adjust the size and speed of the preview window image, creating an auto exposure (which can give you a more accurate preview), and save your preview settings. The Canon CanoScan FB 1200S, the Epson Perfection 1200S and Expression 1600 Artist, the Microtek ScanMaker X12USL, and the Umax Astra 2200 and Astra 4000U all provide excellent software. They offer automated controls for quick color correction, plus manual controls for gamma correction, tone maps, histograms, batch scanning, and color management systems. Microtek's ScanMaker X12USL and Umax's Astra 2200 even offer drivers with beginner and advanced modes. Less effective drivers typically had poor task-oriented user interfaces (Acer 640U), or lacked breadth of controls (Visioneer OneTouch 8600).

Features and Software

BEST SOHO: Umax Astra 2200
BEST CORPORATE: Microtek ScanMaker X12USL

ALL OF THE SCANNERS we reviewed include bundled image editing and OCR software, and some of them even pack document management utilities and applications for producing Web graphics, calendars, greeting cards, and other special extras. One of the most attractive bundles accompanies the Umax Astra 2200; it features Adobe Photoshop 5 LE (see "A Pixel's Worth a Thousand Words," page 161) and full versions of two useful Web applications—Macromedia Fireworks 2 (for Web graphics) and NetObjects Fusion 4 (a graphical HTML editor). All three corporate scanners we reviewed include Adobe Photoshop 5 LE, but none has the more powerful full version of Photoshop.

Because it comes with a built-in transparency adapter, the Umax Astra 2200 is the only scanner here that can scan both reflective and transparent materials right out of the box. Five units—Umax's Astra 4000U, Canon's CanoScan FB 1200S, Microtek's ScanMaker X12USL, and Epson's Perfection 1200S and Expression 1600 Artist—are designed to work with an extra-cost transparency unit. Of the scanners on our SOHO chart, the Epson Perfection 1200S and Visioneer OneTouch 8600 are the only ones you can outfit with a document feeder. The Umax Astra 2200 lacked the option of a document feeder, but this is an uncommon feature on SOHO scanners. In fact, HP's corporate ScanJet 6350C was the only scanner of any type we received that ships with a built-in automatic document feeder.

The attachments for corporate scanners tend to be sturdier and more useful than their SOHO counterparts, and they're designed for high-volume work. The Astra 2200 accommodates only a 4-by-5-inch transparency, while the Canon CanoScan FB 1200S can handle an 8-by-10-inch overhead projector transparency. Likewise, the Epson Perfection 1200S has an optional small transparency module for scanning 4-by-5-inch negatives, whereas the Expression 1600's transparency ▶

adapter weighs several pounds, attaches as a large replacement lid, and permits batch scans of up to 15 slides.

Scan Quality

BEST SOHO: Epson Perfection 1200S
BEST CORPORATE: Canon CanoScan FB 1200S

IN ASSESSING the overall scan quality for a particular unit, we used that scanner's default settings, excluding optical resolution.

Only the Acer 640U, the Canon CanoScan FB 630Ui, and the Epson Perfection 1200S earned the highest rating in any single test of scan quality, and none of these ranked Excellent across the board.

The Acer 640U and the Canon CanoScan FB 630Ui earned Excellent ratings on our maximum-resolution test by reproducing the most accurate color and sharpest details. Surprisingly, these two 600-dpi scanners outperformed all the higher-resolution (1200- and 1600-dpi) models. On this maximum-resolution test, the Visioneer OneTouch 8100—which did not make our list of ten—yielded the worst image: dark with slightly washed-out colors. On the corporate side, the Canon CanoScan FB 1200S outscored the others, with good color accuracy and contrast, but some details (such as the logo text in the model's shirt) lacked sharpness.

When we ran the 75-dpi color test on our color-calibrated monitor, only the Epson Perfection 1200S garnered an Excellent rating, with its dead-on color accuracy and well-honed details. Most of the other chart makers produced acceptable images, though less accurate in color and detail than the top-ranked Perfection. Among SOHO contestants, the Visioneer OneTouch 8600 performed slightly under par, with flat, washed-out colors; meanwhile, Umax's Astra 2200 and 4000U suffered from oversaturated, excessively dark coloration (especially in the red part of the spectrum). Among corporate units, the Canon CanoScan FB 1200S produced the best images, with better color reproduction and sharper details than its competitors.

Scanning by Task

SCANNING PHOTOS for the Web or for fun? Look for:
- Good scanner output at 75 to 100 dots per inch, which are typical dot densities for on-screen viewing. For most printers, 300 dpi is more than enough.
- An image editor chock-full of creative tools and features.

OUR PICKS: Acer 640U, Canon CanoScan FB 630Ui, Epson Perfection 1200S

SCANNING DOCUMENTS at the office? Look for:
- A scan bed capable of handling legal-size scans, unless most of your documents are letter-size.
- Robust OCR software, such as Xerox/ScanSoft TextBridge Pro or Caere OmniPage, to ensure maximum character recognition.
- An optional automatic document feeder that provides the sheet capacity you need.

OUR PICKS: Canon CanoScan FB 1200S, Epson Perfection 1200S, Microtek ScanMaker X12USL

SCANNING GRAPHICS that contain subtle colors and lots of details? Look for:
- Resolution of 1200 dpi or higher to handle top-quality enlargements and scans.
- Maximum color depth of 36 bits or more.
- A transparency adapter capable of scanning 35mm slides or larger transparencies.
- Batch scanning trays, if you plan on performing high-volume slide scanning.

OUR PICKS: Epson Expression 1600 Artist, Microtek ScanMaker X12USL, Umax Astra 4000U

Most units scanned our black-and-white continuous-tone photograph at 600 dpi fairly well, with proper contrast, abundant shades of gray, and decent—though hardly stunning—image detail. The weakest performers on this test were the Acer 640U, Epson Perfection 1200S, Canon CanoScan FB 630Ui, and Microtek ScanMaker X12USL. All four lacked fine detail, especially in shadowy areas, and failed to generate the full range of gray tones evident in our original image.

In our 300-dpi line-art test, the Agfa SnapScan Touch and Microtek ScanMaker X12USL earned ratings of Good, the best scores on this measure. Both units surpassed the others in capturing fine-line patterns and small fonts, despite missing some of the palest objects. All of the other scanners earned a Fair rating. Few scanners come close to matching the detail of the original piece of art. But for scanning everyday line-art items such as the black-and-white logo on a typical letterhead, virtually all of the scanners reviewed here can deliver what you need.

Scan Speed

BEST SOHO: Epson Perfection 1200S
BEST CORPORATE: Epson Expression 1600 Artist

TO MEASURE SCANNER speed, we recorded the time each unit took to scan each test image. For dual-interface scanners, we tested the fastest port provided by the vendor.

In all of our time tests, we took scan preview times into account, since making a preview significantly prolongs the scanning process. Typically, a scanner generates a preview scan in a fast, low-resolution mode, allowing you to tweak settings prior to final scanning. Interestingly, the HP ScanJet 5300Cse (which failed to make our chart, as a result of the unit's disappointing scan quality and Hewlett-Packard's rather tepid support policies) took longer to produce a preview than a final scan in some tests. According to HP, the ScanJet 5300Cse captures more prescan data than many other scanners do, but it makes up the time with faster final scans.

To obtain equivalent speeds for scanners working at different maximum resolutions, we computed each scanner's throughput (in kilobytes per second) ▶

MULTI-TALENTED

The Fujitsu LifeBook™ C Series delivers high performance utilizing a Mobile Pentium® III processor featuring Intel® SpeedStep™ Technology. This advanced multimedia machine includes a large 14.1" XGA TFT display, built-in modem, built-in DVD, wireless IR mouse*, and the amazing LifeBook CoolView status panel.

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Includes Windows® 98 Second Edition – the home version of the world's favorite software.

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*Free with select models.

by dividing the file size the scanner created by the time the unit took to finish the job. Even scanners that offer the same resolution don't capture the same data at the same rate of speed. For example, the 600-dpi Agfa SnapScan Touch created a 36MB file in 78 seconds, while the 600-dpi Plustek OpticPro UT12 took almost three times as long (226 seconds) to produce a similar-size file (36.6MB). In some cases, this time disparity may be due to different scanner calibration techniques or to the quality of the stepper motors (which move the scanning sensor across the scan bed).

Typically a scanner generates a preview scan in a fast, low-resolution mode, allowing you to tweak settings prior to final scanning.

Typically, the fastest scanners use SCSI connections. On the SOHO chart, for example, Epson's SCSI-based Perfection 1200S pushed data through at 577 kbps when set to maximum resolution—that's almost 25 percent quicker throughput than the second-place model, Agfa's USB-based SnapScan Touch, managed. On the corporate side, the Expression 1600 Artist (running as a SCSI model) also moved data quickly at 529 kbps, trailing the Perfection 1200S by only 48 kbps. Not surprisingly (given its higher resolution), the Expression took longer to complete its task: Running at 1600 dpi, the unit produced a sumo-size 262MB final file.

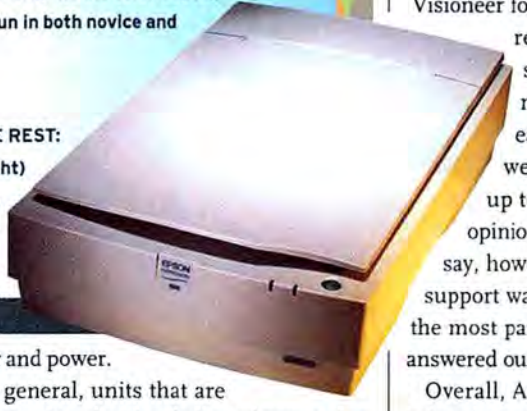
The Expression 1600 scanned our line-art document at 300 dpi in a scant 18 seconds, while its closest corporate competitor, the Canon CanoScan FB 1200S, took approximately twice as long (30 seconds).

In scanning our color photo at 75 dpi, Epson's SCSI-based Perfection 1200S and the Expression 1600 took top honors, at 15 and 13 seconds, respectively. The Visioneer OneTouch 8600 finished a close third at 19 seconds, but most other units took a lot longer, with Umax's Astra 2200 strolling in dead last at 72 seconds.

The Epson Perfection 1200S was again the fastest SOHO model in scanning our gray-scale photo at 600 dpi, finishing in 38 seconds. In contrast, the CanoScan FB 630Ui took 1 minute, 35 seconds. Though the Perfection 1200S's SCSI connection played some part in this numbers game, the main difference involves the 630Ui's use of the same cable for both data transfer and power.

In general, units that are not equipped with a dedicated power plug run considerably slower than units that have separate power and data cables. Among corporate models, the Canon CanoScan FB 1200S was faster than its two ranked competitors—the Epson Expression 1600 and the Microtek ScanMaker X12USL—finishing 13 and 26 seconds faster, respectively, ahead of them.

SMOOTH MOVES: Umax's $199 Astra 2200 (left) wins for ease-of-use functionality and gives users connectivity options (either SCSI or USB), 42-bit color depth, and drivers that run in both novice and advanced modes.



BIGGER AND BADDER THAN THE REST: Epson's Expression 1600 Artist (right) has the highest resolution and price ($899) as well as a dual connectivity interface (SCSI or USB).

Service and Support

BEST SOHO: Acer 640U

BEST CORPORATE: Canon Canoscan FB 1200S

WHEN YOU ENCOUNTER problems, nothing beats live technical support. All the companies featured in this review offer live phone support during normal business hours, but only Acer, Canon, and Umax also provide weekend phone support. With the welcome exception of Acer and Agfa, the other scanner vendors impose a fee for all tech support calls.

To rate each company's ongoing service quality for our *Top 10 Scanners* reviews, we call tech support regularly. Posing as recent purchasers, we ask each vendor typical tech support questions. This month, we asked about proper cleaning and maintenance of the scanner, including whether we could clean the underside of the glass platen. In general, the service we got was on target, but the best advice came from Umax, whose reps e-mailed us a copy of the step-by-step cleaning procedure.

Unfortunately, some of the larger companies (such as Epson and HP) make you wade through a series of branching menus to reach their scanner support people. Adding marketing to misery, during peak business hours, HP and Visioneer forced us to listen to irritating recordings for their express support programs. Furthermore, during at least one call each to Visioneer and Epson, we experienced wait times of up to 15 minutes, which in our opinion was excessive. That's not to say, however, that reaching live tech support was typically problematic. For the most part, technical representatives answered our test calls promptly.

Overall, Acer wins special praise for being the only scanner vendor that offers toll-free 24-hour live phone support, seven days a week. Canon gets a high five for maintaining the most extensive support hours in the corporate group, including 6 hours on Saturday.

Richard Jantz is a computer consultant based in Kensington, California. ■

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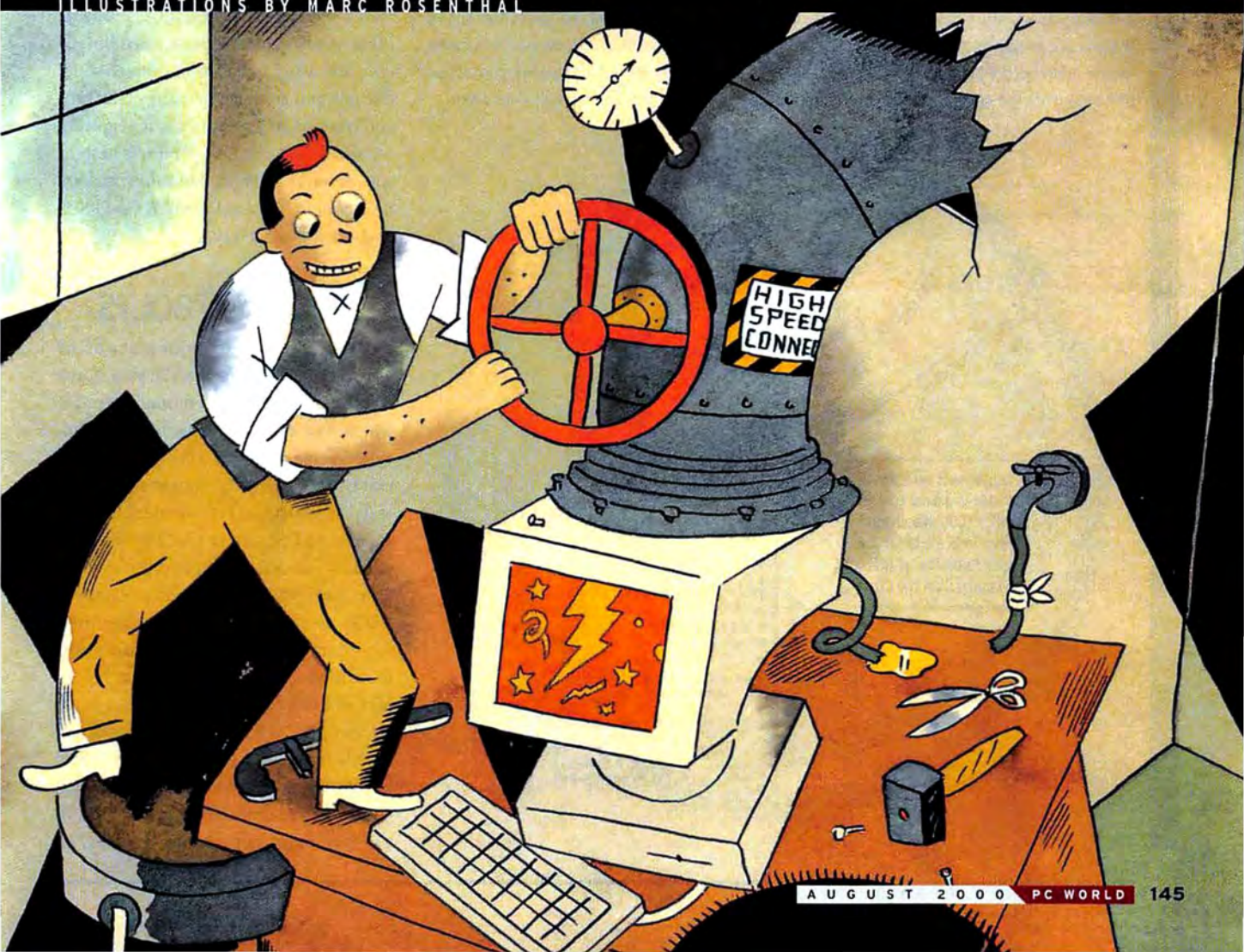
HIGH-Speed SURVIVAL GUIDE

BY STEVE BASS

You've **heard** the horror stories about **cable-modem** and **DSL installations.** Our step-by-step **guide helps you** get and **stay connected**–without hassle. ▶

ILLUSTRATIONS BY MARC ROSENTHAL



THE PHONE RANG. "Mr. Bass?" The voice sounded official. "Your house is glowing on our satellite photos." No wonder. I had two digital subscriber lines (DSL), a cable-modem connection, and an Internet-beaming satellite dish installed in my home office.

See, I'd been given a plum assignment: Get the four high-speed Internet connections installed and running. Then tell *you* how to do it as painlessly as allowed by law.

You'd think it was hog heaven for a technodweeb. It was—at least when everything worked.

No doubt you've heard tales of terror—canceled installation appointments, hosed PCs, and outages so long you go through Web withdrawal. I won't try to buffalo you. Some of the horror stories are true. At the same time, tons of people have had good experiences and are ecstatic with their pumped-up connections.

That's because the leap from 56 kbps to 1.5 mbps is an astonishing experience. Listen, broadband will intensify your Internet life like no other computing upgrade you've tried. How about downloading a 5MB file in less than 29 seconds, or 55 MB in less than 7 minutes? How about no tying up a phone line or even dialing out—since your connection is always on?

Each high-bandwidth service has its own pitfalls and issues. I know, I've been through DSL, cable-modem, and satellite hell and lived to talk about it (just call me Mr. Bandwidth). I've also heard from nearly 400 business and home DSL users. Some of their tales are juicy.

DSL is the new darling of broadband: It's fast, it performs more consistently than cable, it uses your existing phone wires, and you don't share your connection with other homes. If you're close enough to the phone company's central office and the CO is DSL-enabled, it's available. But DSL demand is so high, many would-be users are put on waiting lists. Some installations require repeated visits by technicians. And—as in my case—solid connections just get flaky.

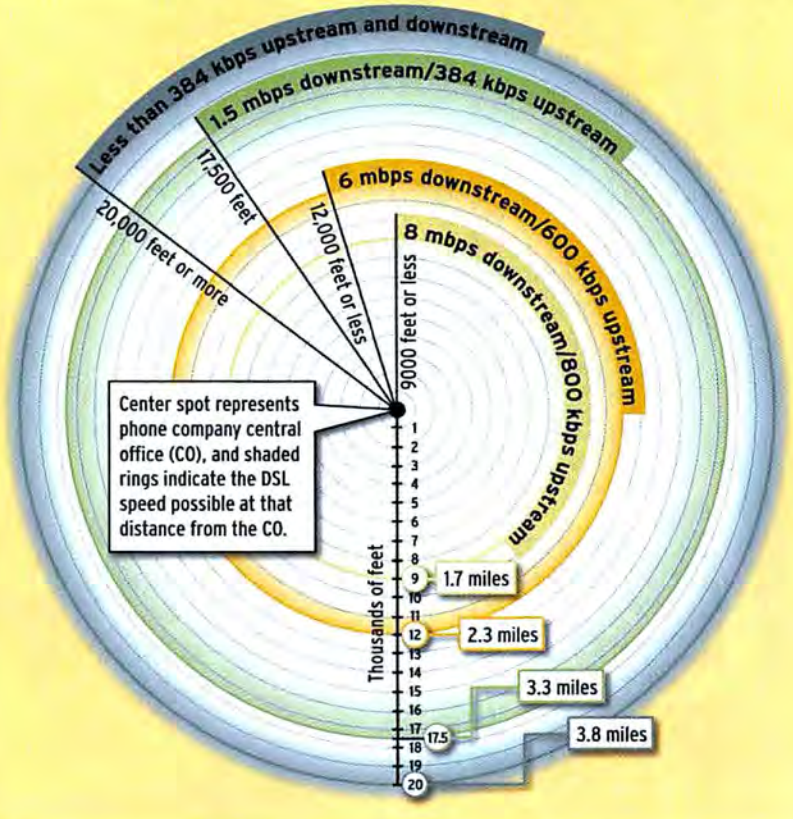
Up until this year, cable modem was easier to get than DSL, and cable installation has always been less harrowing. But cable modem suffers from security risks, just as DSL does, and bandwidth can be sluggish because you connect to a network, just like the local area networks that connect PCs in most workplaces.

Satellite modem is a terrific idea, but only if you can't get DSL or cable modem. While downloading is fast, satellite is one-way (at present) and usually requires analog modem uploads. ISDN? No way—it's expensive, not a continuous connection, and at 128 kbps, slower than molasses.

Fair warning: My allegiance is to DSL. I'll help you get the service, learn the jargon, and avoid installation problems. I'll also give you an understanding of the pros and cons, as well as pointers for figuring out which flavor of DSL service is best for you. If you're interested in cable modem, head over to "Cable Modem: A Good Second Choice," page 147.

FOR DSL, CLOSER IS FASTER

THE SPEED/DISTANCE NUMBERS below are theoretical maximums and represent the speed the line is capable of, not necessarily what the vendor provides. Your DSL connection speed will be influenced by the age, quality, and gauge of your copper wire, among other variables. Distance from the central office is measured in cable length rather than as the crow flies.



DSL NUTS AND BOLTS

DSL USES THE IDLE frequencies of the existing copper phone lines in your home or office. Unlike cable modem service, which your cable company probably provides in only one form, DSL comes in several types—each with distinct advantages and disadvantages. Two you need to know about are ADSL and G.Lite. The latter is a variation on ADSL that computer-savvy users can install by themselves. The *A* in ADSL means that the line is asymmetric—data arrives on your computer (downstream) at a faster rate than it goes back out (upstream).

Most people will need fast download speeds for pulling music and image files off Web servers, among other uses. Unless you're uploading massive files to a service bureau or sending big files ▶

CableModem

A GOOD SECOND CHOICE

CABLE MODEM IS TERRIFIC—if you can't get DSL. There, I said it and wasn't struck by a cable modem outage. I've had a hot-and-cold affair with cable modem. When I first tried having it installed, I was told the wait was nearly a year. By the time the cable company got around to my street, two years had passed. Cable-modem downsides? Your connection may get sluggish as more and more people in your area subscribe, unexpected outages may occur, and technical support can be poor.

Tip **If you're not quite sure whether cable modem service is available in your area, check the cable modem information page at www.cablemodeminfo.com.**

Don't get me wrong, cable modem has many advantages over DSL. Installation is generally easier, and the speed can be higher. MediaOne Road Runner, for example, provides 1.5 mbps downstream and 300 kbps upstream. My service from Charter Communications, on the other hand, isn't terrific: 384 kbps down and 128 kbps up.

Rates and fees are on a par with DSL: Monthly cable charges run from $35 to $55, with installation fees another $100 to $150. My advice? If you're in no rush, wait for the cable company to call you, or watch the newspapers for ads—providers regularly offer free installation.

Some providers will stick you with a $10 surcharge if you don't also subscribe to their television service. Unfortunately, most cable modem providers have a local monopoly, so switching to another cable service usually isn't an option.

When I was finally given an appointment, the technician arrived right on time. Installation took under an hour and was painless. The installer connected the cable modem to my PC, changed the network settings, and spent time explaining what he was doing. He even told me about a few ways to increase my connection's throughput.

Tip **For a few cable modem speed tweaks, try the SpeedGuide page at www.speedguide.net.**

You can make some requests when you have your cable modem installed. Even if you already have cable in your home, the line may be old and brittle, and it could break if you move the modem later. I recommend that you ask for the installation of new cable—but the job may require rewiring from the outside cable source.

To ensure you don't lose bandwidth from line interference, have the installer put filters on all the cable lines, especially if you are also getting television service. If the line needs to be split to reach both the television and the computer, pay the extra money and let the cable company use its equipment to ensure that lines meet the required specifications. For more troubleshooting tips and tricks plus help with setting up your cable modem, check out www.cablemodemhelp.com.

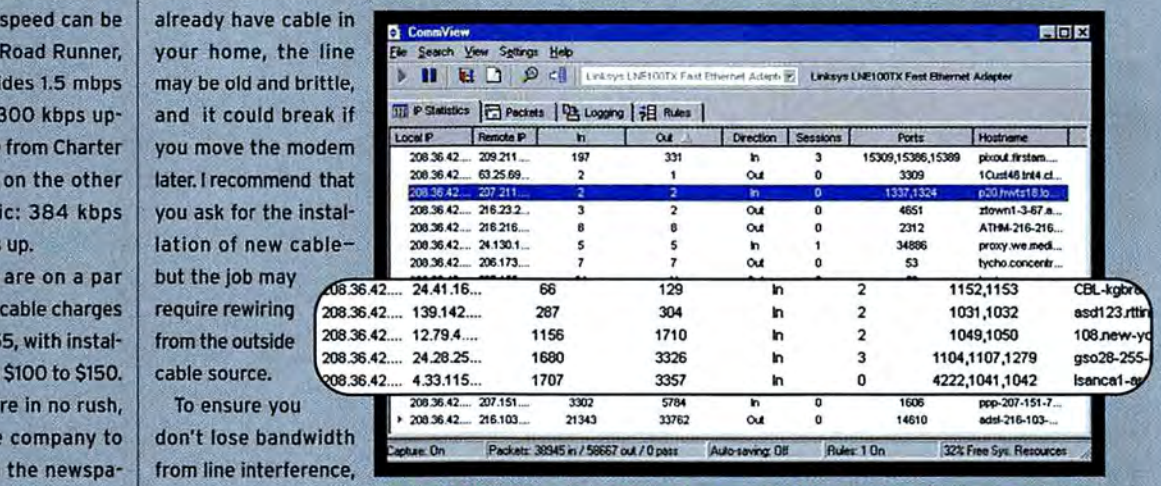
While most cable modem users seem happy with the installation, many are distressed with the support when there are problems. "Installation was a snap," says A. Berger, a Time Warner Cable/Road Runner user in North Carolina. "But the toll-free first-level support personnel, though courteous, often are clueless, with advice that sounds scripted. The local support staff, once I discovered their phone number, were very knowledgeable."

You may see a drop in performance during evening or other peak hours because you're sharing the line with your neighbors. The first six months of my cable-modem service saw wild swings in speed from line sharing. You can find out how many of your neighbors share your bandwidth by running the CommView network sniffer, available at both www.fileworld.com and www.tamos.com/cv.htm. CommView monitors your PC's network activity, including IP statistics and network connections.

It's inevitable that cable access will slow down during high-traffic periods, but you needn't sit still when it happens. Ivan Taylor, a cable modem user in Los Angeles, has a handy tip: "Whenever I see a prolonged period of slowness, I call my cable company and insist that their technicians—not the phone support people—check the settings for my account. Sometimes their system has experienced a minor outage and accounts get reset incorrectly."

You can also file a complaint with the state agency that regulates cable operators. In most states, that agency will be the Public Utilities Commission.

Cable companies may try to blame their problems on your equipment. "After a couple of [outages], I now just tell them to evaluate their own systems first before I spend an hour on the phone doing their tests (on my hardware)," says Rob Frais, an AT&T@Home cable user in Canton, Connecticut.



IT'S A BANDWIDTH-CLOGGED DAY IN THE NEIGHBORHOOD: The CommView network-sniffing utility lets you know how many of your neighbors are sharing your cable-modem connection, along with other network-activity statistics.

from home to the office, you probably won't need a superfast upstream speed.

Tip **If you're a business user and must have fast uploads, look at SDSL.** It's a symmetrical DSL connection that provides the same speed in both directions. You'll pay more for the connection, but you may also get it installed more quickly than you would an ADSL line. That's because vendors selling SDSL bypass the waiting lists by renting lines from the phone company.

Both ADSL and G.Lite have two terrific assets going for them. The first is price. You can grab an ADSL connection for between $30 and $50 a month, depending on your location. If your timing's right, you might pull off a coup and get a free DSL modem and installation. For instance, at press time, Pacific Bell, Southwestern Bell, Nevada Bell, and Ameritech were promoting just that: $40 per month with free installation and DSL modem.

Tip **Check for specials by watching the Web site of each DSL vendor in your area.**

The second key feature after price—and the clincher for me—is that both ADSL and G.Lite let you use one phone line for simultaneous voice calls and high-speed data access (SDSL connections accommodate data only). Saving the cost of an extra phone line for a dial-up modem is enough to justify getting DSL.

HIGH-FLYING SPEED

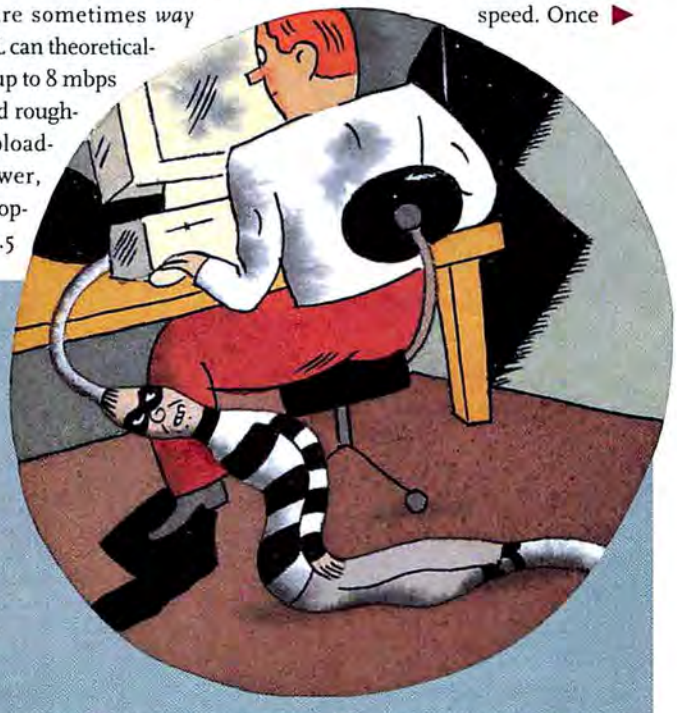
HERE'S HOW to understand the numbers and put them in perspective. Your clunky analog modem lumbers along at 56 kilobits per second. Typical upstream DSL rates range from 128 to 384 kbps, potentially almost 7 times faster than your old modem. Downstream speeds are measured in megabits per second; a 1-mbps line—1000 kbps—is almost 18 times faster.

ADSL speeds are usually advertised as 384 kbps for downstream and 128 kbps upstream. Those are the guaranteed speeds, but they are sometimes *way* faster because ADSL can theoretically handle speeds of up to 8 mbps for downloading and roughly 800 kbps for uploading. (G.Lite is slower, with its downloads topping out at about 1.5 mbps and its uploads at 384 kbps.)

DSL providers can guarantee such speeds because they're selective about their customers. Most will accept orders only if you're within a specific distance from the central office. For instance, Pacific Bell and US West want customers to be within 17,500 feet of the CO, while Bell Atlantic's limit is only 15,000 feet.

Tip **To determine the limits DSL providers set on distance from the central office, check the DSLreports distance chart (www.dslreports.com/distance).**

The sweet spot for a perfect ADSL connection? Less than 12,000 feet from the CO. But if you're less than 17,500 feet from the CO (G.Lite supports 18,000 feet), you'll still be in good shape. The farther you are from the CO, the slower the speed. Once ▶



Guarding AGAINST HACKERS

WARNING: ONCE YOU HAVE HIGH-SPEED ACCESS, you're open to significant security risks. With simple Windows tools, anyone with malicious intent could easily—and invisibly—access and alter your computer's files. Planting a nasty Trojan horse, such as Backdoor or BackOrifice, can be a piece of cake.

John M. Goodman, a computer book author, has had lots of strangers knock at his virtual door. "My BlackIce Defender software reports that in the past three months I've had 628 suspicious attacks and 32 critical attacks. And fewer than half a dozen of those were triggered by me (checking my security)." A suspicious attack may be simply a hacker scanning a wide range of PCs. If your PC is pounded with numerous scans from the same person, though, the threat becomes critical.

DISABLE FILE AND PRINT SHARING

IF YOU HAVE your network's File and Printer Sharing option enabled (the Windows default), you have an enormous security gap on your hands. To disable File and Printer Sharing, click *Start•Settings•Control Panel* and select the *Network* icon, then *File and Printer Sharing*. Uncheck *I want to be able to give others access to my files* and *I want to be able to allow others to print to my printer(s)*. Click *OK* twice.

Find out if you're vulnerable to attack by logging on to Steve Gibson's ShieldsUp site (grc.com/ShieldsUp). You'll get the straight scoop on Internet security, a valuable probe of your system's defenses, and a comprehensive how-to tutorial.

Another security issue: With a continuous connection, both static and dynamic IP addresses can be seen by hackers, making it even easier for them to break into your PC. Three useful firewall programs are Zone Labs' free ZoneAlarm ($20 for business use); Symantec's $60 Norton Internet Security 2000, which includes both a firewall and Norton AntiVirus 2000; and Network ICE's $40 BlackIce Defender, which guards your system from all means of intrusion. All three are fail-safe, locking your network down tight. Don't browse on broadband without one.

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you get past about 22,000 feet, you're heading for DSL never-never land. Don't forget, though, that there's still cable modem or satellite—or a moving van. You can check whether you're close enough to qualify for DSL by going to the 2Wire site at www.2wire.com/dsllookup/finddsl82.asp. After you enter your street address, it tells you whether you're within the allowable distance from the CO and estimates the maximum speed you can get. But only your DSL vendor can determine your *exact* distance from the CO.

PICK A PROVIDER

BEFORE CHOOSING a DSL provider (most are ISPs) check with the comp.dcom.xdsl newsgroup and listen to what other DSL users are saying. Read the news at DSLReports.com, the premier DSL resource site. Consider picking up David Angell's *DSL for Dummies* (IDG Books, $25, 1999). Then dig deeply into the resources listed in www.pcworld.com/aug00/dsl.

Tip For a comprehensive list of DSL providers in your area, check out Internet.com's The List at www.thelist.com.

Local phone companies are obligated to allow third-party companies—known as Competitive Local Exchange Carriers—into their CO. Covad, Rhythms, NorthPoint, and other CLECs rent the "last mile" of copper lines—the distance from the CO to your home or office—from the telephone company. CLECs usually partner with Internet service providers, and consumers generally deal with the ISP, not with the CLEC.

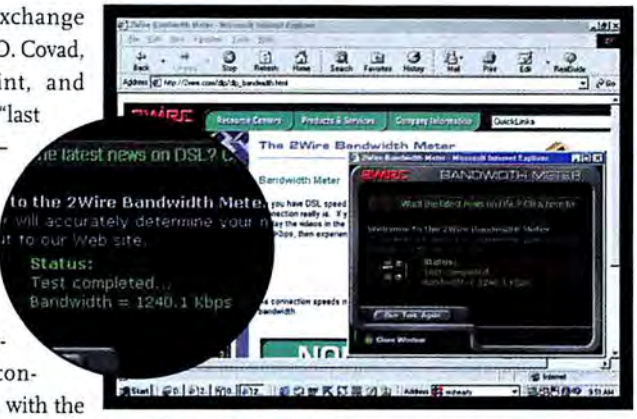

FIGURE 1: THE 2WIRE SITE AT www.2wire.com lists DSL availability and ISP rates, and tests your bandwidth (inset).

Some ISPs use Point to Point Protocol Over Ethernet connections. PPPoE makes your DSL connection work like a dial-up account. You'll still have a perpetual connection, but to get onto the Internet, you'll need to use a dialer once a day.

Tip To compare ISPs' monthly rates for DSL in your area—and to read both glowing and scathing customer reviews—check out the 2wire site (www.2wire.com/dsllookup/finddsl82.asp).

If you're computer savvy, consider installing the DSL kit and kaboodle yourself. Many ISPs will waive the installation charges. Telocity (www.telocity.com) charges $25 to ship a do-it-yourself kit—modem, filters, cable, and software—and offers a 30-day service guarantee.

BEFORE INSTALLATION

ONCE YOU'VE SETTLED on a DSL provider, you need to do some hardware homework before the installers arrive.

- Check your PC and make sure a slot is available for a network card. An alternative is to use a USB ethernet ▶

DSL Q&A

WHAT TO ASK

HERE ARE SOME QUESTIONS to ask the DSL provider before placing an order—and, with luck, before the DSL goblins strike.

- *How long have you been in business?*

I recommend you choose a company with at least three years of experience.

- *Do you offer 24/7 technical support?*

Think Sunday night, big project due Monday, Web access essential.

- *Do you provide dial-up access for use when I'm traveling?*

If you're on the road a lot, find an ISP that provides at least 60 minutes of dial-up time, preferably toll-free.

- *Are there any current promotions, and is there a price guarantee if you drop your fees later?*

This information may not be volunteered, so you better ask.

- *Can I get an external rather than an internal modem?*

External modems are better because you can watch the indicator lights, which makes troubleshooting lots easier. And powering down the modem doesn't involve rebooting your PC.

- *Is there a charge to install an ethernet jack in other rooms?*

If the charge is nominal, get an extra jack in any room that may eventually have a computer.

- *Is the amount of data that can go through the DSL connection restricted?*

If you need to download humongous amounts of data, choose an unlimited plan. Although most ISPs allow unlimited access, it's wise to ask and be sure.

- *What is the bandwidth guarantee, and is it tied to a yearly contract? Is there a penalty to cancel?*

If the bandwidth drops below guaranteed rates, you may qualify for a refund, or you may even be able to break the contract.

- *Is inside installation included? If not, do I pay a flat rate or an hourly fee?*

Hedge your bets: If your home has old wiring, opt for an ISP with free installation or a flat fee.

- *Will the installer actually connect the DSL and make sure that it works with my computer?*

If you're not technically adroit, this question's critical. Often the ISP's technicians check the line with their notebook computer and leave the rest to you.

- *How many computers can I connect to this DSL hookup? Does the modem you supply double as a router?*

Determine if the provider restricts your use of a router or any device that allows you to share the connection.

- *Do you supply a static or dynamic IP address?*

A static address is exclusively yours; dynamic IPs are randomly assigned each time you log on. It usually doesn't matter unless you want to use your PC as a Web or FTP server (then you'll need a static address). Many DSL providers don't give you the choice, and some explicitly forbid you from running a Web server.

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to download music,

you're going to need a good set of earplugs

and a set of these.

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Sharing ALL THAT SPEED

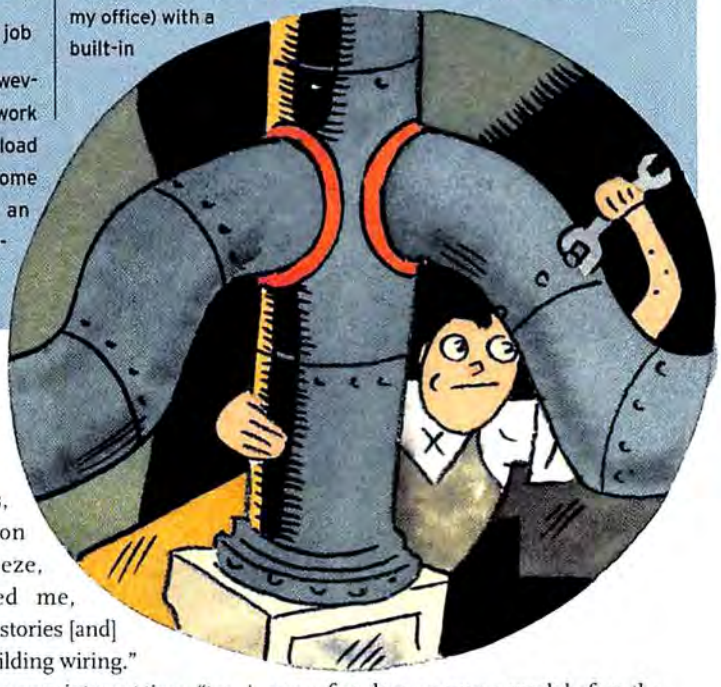
ONCE YOU GET DSL OR CABLE MODEM service, you'll want to share it with others in your home or business. In fact, if you have two PCs, you'd be silly *not* to give everyone a piece of the speed, since networking multiple systems is now a cheap and easy job (see "Home Wired Home," www.pcworld.com/jun00/network).

WinGate Home can get everyone onto your high-speed bandwagon. The $40 program is easy to install and links up to three networked PCs on one Net connection. (If the one PC connected to the Internet crashes, however, everyone else on your network loses the connection.) Download a trial version of WinGate Home at www.fileworld.com. As an alternative, use Internet Connection Sharing, a feature built into Windows 98.

THE HARDWARE WAY

A BETTER WAY to share the connection—and the way I do it—is with hardware, which allows me to turn my PC off for the night while my wife is still connected to the Internet. I'm using Linksys's $199 Instant Broadband EtherFast Cable/DSL Router. It's a four-port router (expandable to 253 users, though preferably not all in my office) with a built-in firewall. The router needs only one IP address, works with Point to Point Protocol Over Ethernet as well, and is easy to install.

There's ample help for learning how to share a Web connection. For cable modems, check Tim Higgins's site (www.timhiggins.com). DSL subscribers can investigate the details at DSLreports (www.dslreports.com/tweaks).



adapter to make the network connection.

- See if you have enough RAM. Most ISPs require 32MB of RAM on your PC and recommend 64MB.
- Get your system working—without errors—before the installer arrives. Then do a full backup.
- If you already have a network installed, use NetSwitcher, an $8 shareware program (available on www.fileworld.com) to preserve your network settings. If there's a problem, NetSwitcher will let you restore the old settings.
- Turn off your antivirus software (which is always a good idea before doing any new software installation).

DURING INSTALLATION

SOME 400 DSL SUBSCRIBERS responded to a poll I took, and their experiences prove that every installation is different. While many DSL installations go like clockwork, others can be harrowing. Service technicians are often poorly trained, appointments aren't honored, and troubleshooting is mind-numbing.

Want more? Your Windows system may get hosed in the process. "It took four sets of techs ten days to finally get my computer running like it was prior to their installation," says Krystyna Jutson of South Pasadena, California.

On the other hand, Dan Vittum, an InterAccess subscriber in Chicago, says, "DSL installation went like a breeze, which surprised me, given the horror stories [and] my archaic in-building wiring."

Before you set an appointment time, "try to get in touch with everyone involved—the installer, ISP, and telco—before they arrive at your door, and make sure everyone knows what's on the order," says David Schachter, a start-up CEO living in San Francisco. In Schachter's case, the technician was ready to install an SDSL line at his house, while Pac Bell was at the CO setting up for a G.Lite installation.

My advice? Ask the provider for an order number so you can call a day or so before the scheduled appointment. Then request that the installer call before coming out. Try to get a morning appointment, the first of the day. Later appointments are riskier: If the technician gets stuck with a gnarly installation just before yours, guess who's going to wait?

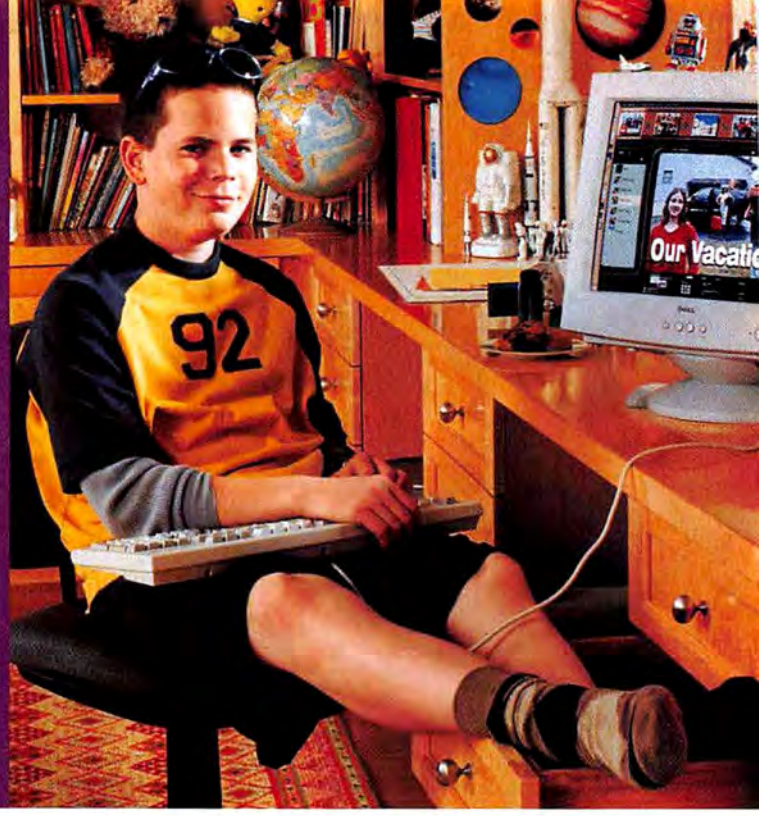
Installation generally has two stages: First, the telco will send someone to your home to test the "last mile," the line between the CO and you. This might happen a few days or even a week before the actual installation. Next, a technician will come to your home, perhaps replace your existing copper line, and install and test the DSL modem.

Often installers aren't allowed to connect the DSL to your PC. Instead, they'll bring a notebook PC to verify the connection, hand you a network card, and say adios. My installer had a hearty laugh when I asked her to connect my PC. But I offered her a cup of java, and guess what? She didn't hesitate hanging around while *I* finished the installation, all the while offering sage advice.

Tip **Record all the network settings before the installer leaves. And put on a pot of coffee in advance.**

The installer will undoubtedly test your line's bandwidth. But it's still a good idea to run a few Internet speed tests yourself. While time of day and Internet traffic will affect the test results, you should still ▶

17 hours of our trip to Mt. Rushmore edited down to 4 thrilling minutes.



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be able to tell whether you're getting what you paid for. If the speeds aren't up to snuff, complain loud, long, and vigorously. Try out the speed tests at 2wire (www.2wire.com; see **FIGURE 1**, page 150) and the ones at DSLReports (www.dslreports.com/doconcern; see **FIGURE 2**).

Tip **Before and after you perform any speed test, clear your browser's cache.** That way, the test is performed using files that are from the Internet rather than files in your hard drive's cache. In Internet Explorer 5, select *Tools•Internet Options*, and click *Delete Files* (in IE 4.72, you'll find Internet Options under the View menu). In Netscape Navigator, select *Edit•Preferences*, move down to *Advanced*, click *Cache*, and then click *Clear Disk Cache*.

AFTER INSTALLATION

I CHOSE ISPS Concentric and EarthLink for my two DSL connections so that if I had any trouble—which I did—the ISP would handle the finger pointing. When my line went south, I called EarthLink; the company contacted Pacific Bell and did the dirty work for me.

My fast Concentric SDSL 1.1-mbps line worked like a charm for three months. Then one day it unceremoniously dropped to 192 kbps. (My chin is still bruised from the short stop.) The culprit was corrosion on the phone lines, a common mishap. In my case, water from a recent rain had seeped into the cabling outside my office. Solving the problem took four calls to Concentric's tech support, a few e-mails detailing the problem, and an hour's worth of online testing with a technician. Once the problem was pinpointed, Concentric worked with Covad and Pac Bell to track down and resolve it.

Tip **Document any problem so you can present technical support with details**—when speed dropped, how long it was slow, and what you did to remedy it. If you don't like the response, dig in your heels and ask for the next tier of support.

If your supersonic DSL line starts acting like your old analog connection, here are a few things to check:

- Make sure you use the cables supplied by the vendor: The cable from the wall jack to the DSL modem may look similar to the cable from the modem to your PC. Chuck Buchheit, a Las Vegas consultant, got his DSL connection running only after he switched to the cable supplied by Sprint with the DSL modem. "I dug out the cord that was shipped with the modem, we got it to sync, and voilà—124 kbps up and 512 kbps down, as advertised," says a sheepish Buchheit.
- Check the network card: If your system crashes more often or you get random error messages after DSL is installed, the problem may be due to a network card conflict.
- Check your passwords: Your DSL modem may come with a default password. It's essential to check the manual and change it immediately.
- Don't throw away the ferrite chokes: "Those little plastic cubes that wrap around the modem's cable and power line keep interference from radios and other devices out of your LAN," advises Saul Roe, a Pasadena, California, consultant.
- Reboot the modem: If you lose all Internet access, simply unplug the power cord, wait 30 seconds, and power up the modem again. If that doesn't help, check the modem's Sync or Link lights. Blinking indicates a line problem. Make sure all the cabling is attached snugly (something I unhappily discovered was not the case on my system).
- Get a microfilter: After getting DSL you might notice static, humming, or noise on your phone line. If your DSL connection uses a line splitter, call your provider and ask if microfilters can be installed on each voice device sharing the line. Devices in your home also emit radio frequencies that can interfere with your DSL. Isolate your modem from halogen lamps and AM radios.
- Fix sluggish downloads: If your Windows dial-up settings were tweaked for faster throughput, you may need to untweak them for DSL. Pacific Bell subscriber Doyle Strange discovered that the PC changes he made to speed his analog modem actually slowed his DSL. Check the Navas page at navasgrp.home.att.net and DSLreports at www.dslreports.com/tweaks to check your settings.

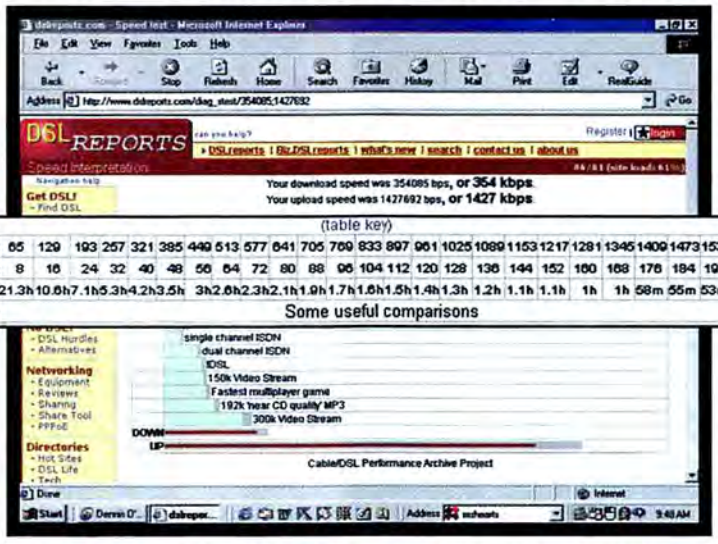

FIGURE 2: THE DSLREPORTS WEB SITE at www.dslreports.com provides DSL upload and download speed tests, along with a chart of speed comparisons.

BlackIce Defender
$40. Network ICE, 650/532-4100, www.networkice.com

Linksys Instant Broadband EtherFast Cable/DSL Router
$199 list price. Linksys, 800/546-5797, www.linksys.com

Norton Internet Security 2000
$60 list. Symantec, 800/441-7234, www.symantec.com

Sprint Broadband Direct
$40 per month, plus one-time equipment charge ($99 to $299). Sprint, 888/996-0001, www.sprintbroadband.com

WinGate Home
$40. Deerfield.com, 517/732-8856, www.wingate.com

ZoneAlarm
Free for personal use. Zone Labs, 800/210-5517, www.zonelabs.com

online *You can find files mentioned in this article at www.fileworld.com/magazine. Steve Bass is a* PC World *contributing editor and writes the monthly* Home Office *column.* ■

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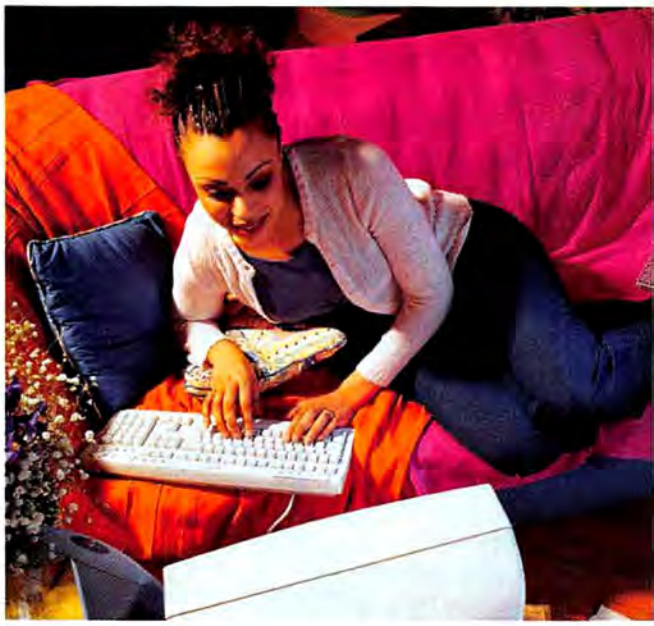

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Power Image 733 illustrated

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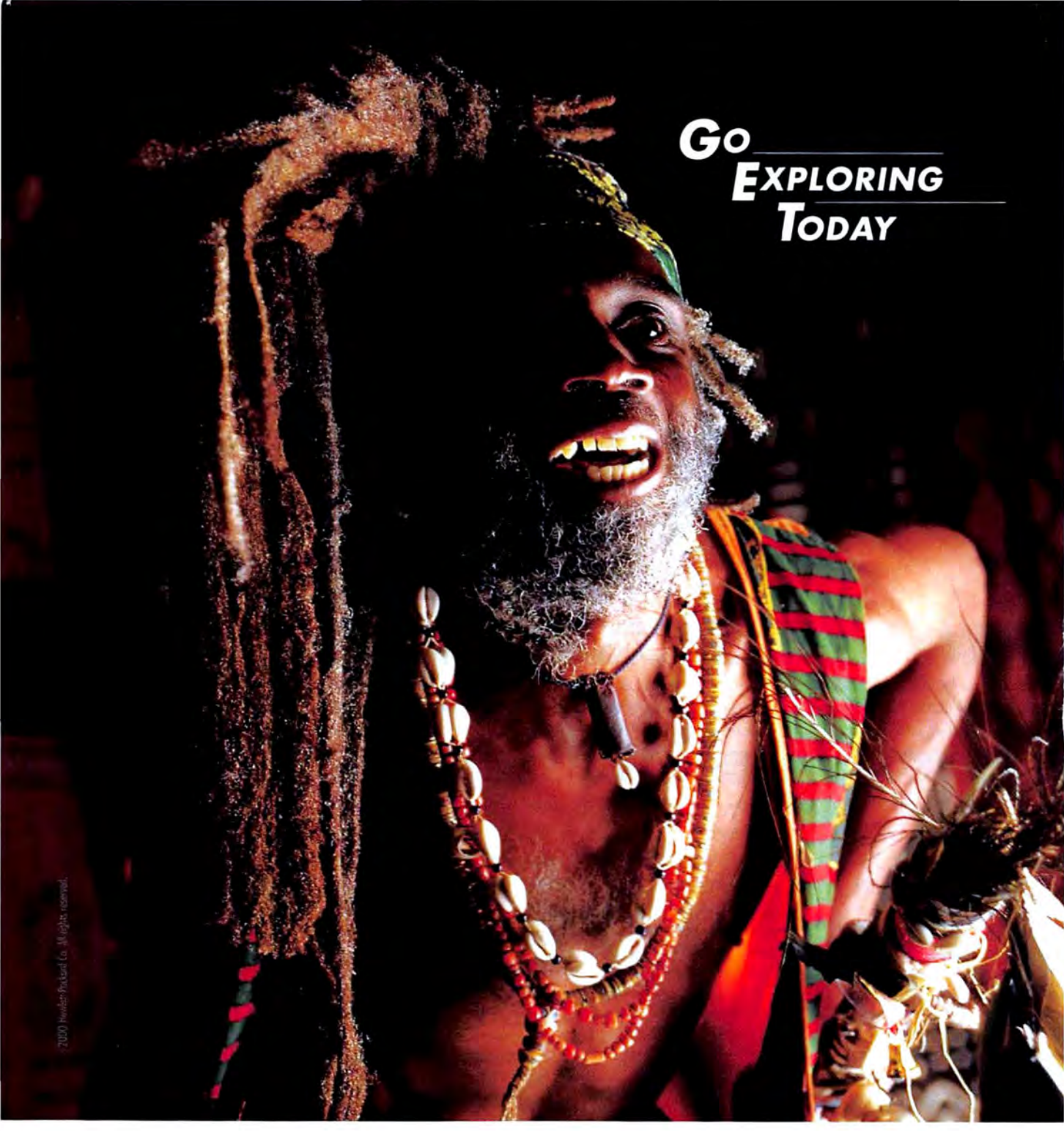

Internet Ideas

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a pixel's worth a thousand words

BY ALAN STAFFORD

Inexpensive image editors promise to deliver Photoshop-like power at a much lower price. We zoom in on the best of the batch.

PHOTO ILLUSTRATION BY CHARLES MIZE

In high school, the guy who took your yearbook photo assured you that the pimple on your nose could be airbrushed out. At your first job, the woman behind the print shop counter guaranteed she could "Photoshop out" the person who just quit from the company picture. But now it's your turn at the image-editing keyboard, ready to prepare graphics for your presentation or create a company brochure.

You can get professional-quality results when you edit images with your PC, but you need the right software. Among graphics pros, Adobe Photoshop 5.5 is the tool of choice for processing images. But Photoshop costs more than $600, and the pros take classes, attend seminars, and hone their skills for years to use the application to its full potential. With recent drops in prices for scanners and digital cameras, nonprofessionals interested in digital imaging are clamoring for applications that can produce professional results without a big investment. Which ones really work? We examined 17 affordable image-editing applications (most of them priced under $100) to see how they measure up to the Photoshop standard.

WHAT CAN YOU GET FOR CHEAP?

ALL IMAGE EDITING applications—including Photoshop—can import images, perform minor touch-ups, and prepare pictures for attaching to e-mail messages, posting on the Web, or printing. So what's different about a less expensive package?

Most inexpensive products use wizards to walk you through the editing process, whether simple or complex—and whether you like it or not. They can produce pleasing results but may hamper your ability to navigate. For example, when you're in certain windows marching through a wizard's steps, you'll see some tools but not others; that's because the designer figured you might otherwise be distracted by the presence of tools you don't need. But if you want to use a tool that isn't visible, you're out of luck. Some programs don't let you make changes without using a wizard, so you have far less control. In contrast, Photoshop provides little on-screen hand-holding but lets you switch tools

PHOTO EDITORS

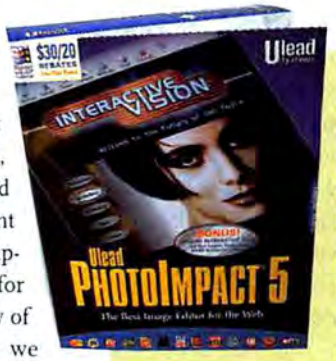
		Basic features				Creative effects		
PRODUCT	Street price (5/30/00)	Multiple undo	Red-eye removal	Dust/ scratch removal	Selection tools	Layers/ transparency	Masks	File formats supported
Adobe PhotoDeluxe Business Edition 1 800/888-6293 www.adobe.com	$79	○	●	●	Rectangle (several types), color wand, magnetic lasso	●/●	○	GIF, JPEG, Photoshop EPS, PSD, TIFF
Adobe Photoshop LE 5 800/833-6687 www.adobe.com	$95	○	○	●	Rectangle, lasso, magic wand, freehand, magnetic lasso	●/●	●	GIF, Illustrator EPS, JPEG, Photoshop EPS, PSD, TIFF
ArcSoft PhotoStudio 2000 800/762-8657 www.arcsoft.com	$40	●	●	○	Rectangle, magic wand, freehand	●/●	●	GIF, JPEG, PSD, TIFF
Brøderbund The Print Shop Photo Pro 800/395-0277 www.expressit.com	$50	●	●	●	Rectangle, magic wand, freehand, edge finder	●/●	○	GIF, JPEG, PSD, TIFF
Corel Custom Photo 800/772-6735 www.corel.com	$50	●	●	●	Rectangle, freehand, paintbrush selection	●/●	○	GIF, JPEG, PSD, TIFF
Jasc Software Paint Shop Pro 6 800/622-2793 www.jasc.com	$109 [2]	●	○	○	Rectangle, magic wand, freehand	●/●	●	GIF, Illustrator EPS, JPEG, Photoshop EPS, PSD, TIFF
MGI Photo Suite III Platinum Edition 888/644-7638 www.mgisoft.com	$50	●	●	●	Rectangle, magic wand, freehand, edge finder	●/●	○	GIF, JPEG, Photoshop EPS, TIFF
Micrografx Picture Publisher 8 888/744-1210 www.micrografx.com	$50	○ [3]	●	○	Rectangle, magic wand, freehand	●/●	●	GIF, JPEG, Photoshop EPS, PSD, TIFF
Microsoft PhotoDraw 2000 800/426-9400 www.microsoft.com	$109	●	●	●	Rectangle, draw to select color range, freehand	●/●	●	GIF, Illustrator EPS, JPEG, Photoshop EPS, PSD, TIFF
Microsoft Picture It 2000 800/426-9400 www.microsoft.com	$55	●	●	●	Rectangle, magnetic lasso, magic wand, freehand	●/●	○	GIF, JPEG, PSD, TIFF
ScanSoft PhotoFactory 888/345-6203 www.scansoft.com	$50	●	●	●	None	●/●	●	GIF, JPEG, PSD, TIFF
Ulead PhotoImpact 5 310/523-9393 www.ulead.com	$80	● [3]	●	●	Rectangle, magic wand, freehand	●/●	●	GIF, JPEG, Photoshop EPS, PSD, TIFF
Adobe Photoshop 5.5 800/833-6687 www.adobe.com	$609	○ [1]	○	●	Rectangle, lasso, magic wand, freehand, magnetic lasso	●/●	●	GIF, Illustrator EPS, JPEG, Photoshop EPS, PSD, TIFF

Best Buy ● Yes ○ No

[1] Can export CMYK layers. [2] $99 if purchased via the Internet. [3] Includes Command Center.

quickly and make a wide range of manual adjustments.

Costlier photo editors permit more flexibility in other ways, too. Photoshop can import and export a large number of different file formats, such as EPS (Encapsulated PostScript, often used for company logos), whereas many of the less expensive products we looked at choked on EPS files. And most low-cost products don't allow editing or exporting CMYK images—images rendered in the four colors (cyan, magenta, yellow, and black) a printing press uses. If you can't work with CMYK files, your screen (which creates colors using red, green, and blue) won't show what the final image will look like, and you won't be able to create a file suitable for printing on a professional press.



winner in a photo finish

OUR BEST BUY, Ulead's $80 PhotoImpact 5 offers great power for beginners and experienced users alike, and it doesn't cost much more than the wimpiest tools we reviewed. PhotoImpact offers more features than any other product we considered, and you can customize its tools more completely. As a result, you get the effect you want, rather than the effect you'd otherwise have to settle for.

APPLES AND GRAPEFRUITS

IT MAY SEEM UNFAIR to compare programs that cost an average of $70 with a $600 application. After all, you may not care about CMYK—you may just want a photo editor to help you create images for your Web site. But these products have to do several things well to be worth even $50, so we matched the low-cost packages against each other while keeping Photoshop as a high-end reference standard.

To test the 17 products in this review, we put each one to work, combining three images and applying touch-ups along the way. Our goal was to create a real estate advertisement with minimal effort. All of the applications we tested can accomplish at least some of the tasks, but some could not handle certain chores at all, and others made getting the job done too laborious.

Several products excel at different tasks, but Ulead's $80 PhotoImpact 5 earns our Best Buy award because it is the most capable, well-rounded product. PhotoImpact 5's Photoshop-like selection tools let you pick precisely the part of an image you want to work on—and includes many levels of customization. Despite its panoply of features, PhotoImpact remains easy to use and avoids inflexible wizards.

Other products came close to matching PhotoImpact, but each fell short in one area or another. Jasc Software's $109 Paint Shop Pro 6 offers almost as many capabilities as PhotoImpact, but it costs $30 more. ArcSoft's $40 Photo Studio 2000 is similarly easy to use, but omits a few useful functions, such as sophisticated color correction. And ScanSoft's $50 PhotoFactory (which includes Kai's PhotoSoap2) presents a beautiful if quirky interface that allows you to produce truly elegant images, but the package lacks some important selection tools, among other features. That said, PhotoFactory is the most fun application to use: Instead of requiring you to paint and correct with circles and rectangles, it lets you daub your pictures with tools that look like real paintbrushes, erasers, and buckets.

Adobe's $79 PhotoDeluxe Business Edition 1 and Microsoft's $55 Picture It 2000 provide the best wizards. The wizards in Picture It raise and answer logical questions you might ask when embarking on a task—when you're trying to eliminate red eye, for example, it asks, "What if the discoloration isn't red?" Unfortunately, both programs' wizards hinder access to other tools. Other packages have similar ups and downs, among them Adobe's Photoshop LE 5 ($95), Broderbund's The Print Shop Photo Pro ($50), Corel's Custom Photo ($50), MGI's ▶

PHOTOGRAPH: KEN SMITH

Processing tools		Support		
Color modes supported	Resampling	Costs & limitations	Hours/ days per week	Comments
RGB	●	Free, unlimited, toll call (first incident only; thereafter, $25 per incident)	11/5	**PRO:** Includes photo organizer, panorama stitching, and .jpg cleanup tool. **CON:** Wizards limit navigation.
RGB	●	Free, unlimited, toll call (first incident only; thereafter, $25 per incident)	11/5	**PRO:** Refined interface. **CON:** Stripped-down version of the full product falls short of less expensive products.
RGB[1]	●	Free, unlimited, toll call	9/5	**PRO:** Comes with photo stitcher, batch processing, albums, slide shows. **CON:** Text tools don't measure up.
RGB	○	Free, unlimited, toll call	11/5	**PRO:** Provides albums and slide shows, long tips for beginners. **CON:** Won't resample images.
RGB	●	Free, unlimited, toll call (first incident only; thereafter, $25 per incident)	11/5	**PRO:** Comes with lots of images and fonts, plus a color-matching chart. **CON:** The confining menus.
RGB[1]	●	Free, unlimited, toll call	10/5	**PRO:** Animation tools, imports Illustrator EPS. **CON:** Most expensive package here, limited CMYK support.
RGB	○	Free, unlimited, toll call	9/5	**PRO:** Stitching, photo tapestry, and slide show features. **CON:** Open a second image, and your tools reset.
CMYK, RGB	●	Free, unlimited, toll call (first 30 days; thereafter, $30 per incident)	10/5	**PRO:** Low-res preview, Command Center lists recent actions. **CON:** Deselecting can be a pain.
RGB	●	Free, unlimited, toll-free, Saturdays 10 a.m. to 3 p.m.[4]	16/5	**PRO:** Can save images as PowerPoint backgrounds, extended help views. **CON:** Cumbersome navigation.
RGB	●	Free, unlimited, toll-free, 16 hours/day weekdays, 8 hours/day weekends	16/5	**PRO:** Hokey sounds may entertain kids. **CON:** Must hit Done button to complete every action.
RGB	●	$15 per call, toll-free, or free e-mail support	9/5	**PRO:** Exports to Photocube, includes PowerShow and SuperGoo. **CON:** No selection tools.
RGB[1]	●	Free, unlimited, toll free call	9/5	**PRO:** Image optimization, brush customization. **CON:** Cannot select a portion of an already-placed layer.
CMYK, RGB	●	Free, unlimited, toll call (90 days; thereafter, $25 per incident)	11/5	**PRO:** Includes ImageReady for creating Javascript rollovers, animated GIFs. **CON:** Expensive, tough to learn.

[4] Charges apply to calls made at all other times: weekdays 5 p.m. to 9 p.m. PST, Saturdays 9 to 10 a.m. and 3 to 5 p.m. PST, and Sundays 9 a.m. to 5 p .m. PST.

[1] Includes History Palette.

Photo Suite III Platinum Edition ($50), Micrografx's Picture Publisher 8 ($50), and Microsoft's PhotoDraw 2000 ($109).

We also looked at Canon's $50 Photo Gold, Epson's $40 Film Factory 1.03, Ixla's $50 Photo Easy, Professor Franklin's $50 Instant Photo Effects, and Sierra Imaging's $50 Image Expert 2000. Each of these five programs does some things well (such as cataloging images) but has far fewer features than the top 12 programs for roughly the same price. Here, we'll focus on the more advanced products. For a detailed analysis of them, see the features comparison chart on page 162. (You'll find reviews of every product we tested at www.pcworld.com/aug00/image.)

Hardware products such as digital cameras and scanners often come bundled with a free photo editor—including many we reviewed. But if you get a weaker product and you plan to do any serious photo editing, spend the extra money and get a program that rewards your effort.

THE BASICS YOU NEED

THE APPLICATIONS we tested claim to supply all the basic tools you need to massage your pictures. But some lack features you should expect even from a low-cost program. We consider three capabilities indispensable: robust selection tools, an effective red-eye reduction method, and multiple levels of undo and redo.

Good selection tools simplify photo retouching and allow you to modify just the problem areas of a photograph, producing better final images. For example, to fix red eye, you must be able to limit changes to the eyes, without affecting the subject's hair color. Most programs use "marching ants"—moving black dots that surround the edges of the selection—to identify a selection. This is a clean, coherent method. Less usefully, Microsoft's PhotoDraw 2000 shows a box around the selection, but the box doesn't adhere to the exact edges of the selection. ScanSoft's PhotoFactory offers no selection tools.

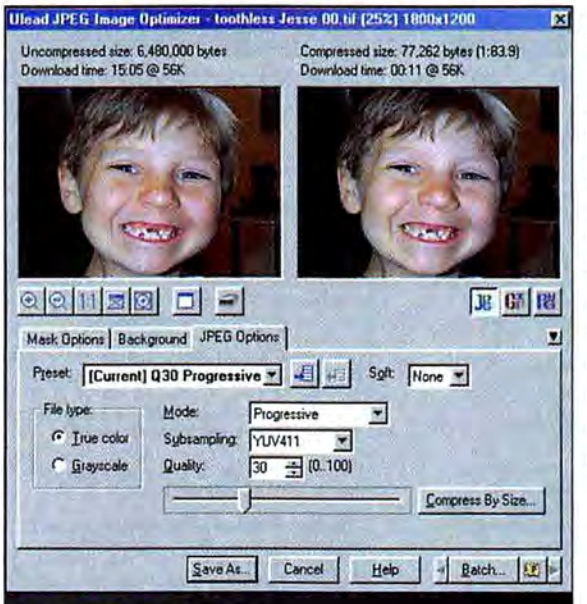
Brøderbund's The Print Shop Photo Pro, MGI's Photo Suite III Platinum Edition, and both Microsoft products feature an edge finder (also known as a magnetic lasso) that lets you obtain an accurately drawn selection without having to perform painstakingly exact mouse movements. Instead, you draw close to the edges of the section, and the magnetic lasso then automatically snaps to the visual edges it locates to create your final selection.

If you're an absolute beginner, you may be tempted to choose a wizard-based program. But if you use it extensively, the wizards will soon get in the way.

A truly useful selection tool should include tolerance adjustments, which let you choose how picky the tool will be in matching your criteria. All of the applications here offer at least some tolerance adjustment; a few—including Jasc's Paint Shop Pro 6 and Ulead's PhotoImpact 5—build precise tolerance adjustments in all of their tools, allowing you to make a selection quickly and accurately. In contrast, Microsoft's Picture It offers only a few adjustment steps in most of its tools.

Red-eye reduction is one of the most popular features in an image editor—and one of the hardest to do well. Print Shop Photo Pro's tool does it best, allowing you to easily adjust the size and type of color you apply. The tool is smart, too: It won't let you color the white of the eye, no matter how hard you try. At the other extreme, Microsoft's Picture It applies opaque black circles over the pupils, rather than a semitransparent color, producing a grotesque, dead look.

Having to start over can be frustrating because it often involves painstaking fine detail work. Luckily, several products support multiple levels of undo and redo. Not only does Ulead's PhotoImpact offers several undo/redo levels, but its menus list the steps you've taken so you can go back several steps with one click. Adobe's PhotoDeluxe and Micrografx's Picture Publisher 8 lack multiple undo/redo, but Picture Publisher offers an alternative, called a Command Center, that resembles the History Palette in Photoshop. In a window, the Command Center and the History palette list the actions you've taken, and you can selectively delete them or save them. Picture Publisher also allows you to use an eraser to scrub off applied effects gradually, down to the original pixels (Jasc's Paint Shop Pro can do this, too). Unfortunately, Adobe stripped Photoshop LE of this feature.



OPTIMIZING BEFORE YOU TRY TO POST an image to a Web site, you should reduce its file size. Ulead's PhotoImpact 5 does the best job of the packages here, mostly because of its many different adjustments. Before and after views of the image (above) let you check on the effects of your tweaks as you're making them.

YOUR CREATIVE SIDE

YOU MAY BE willing to accept missing features in your photo editor if it produces good results. Several applications put powerful tools at your fingertips. The main artistic features we looked for were lay- ▶

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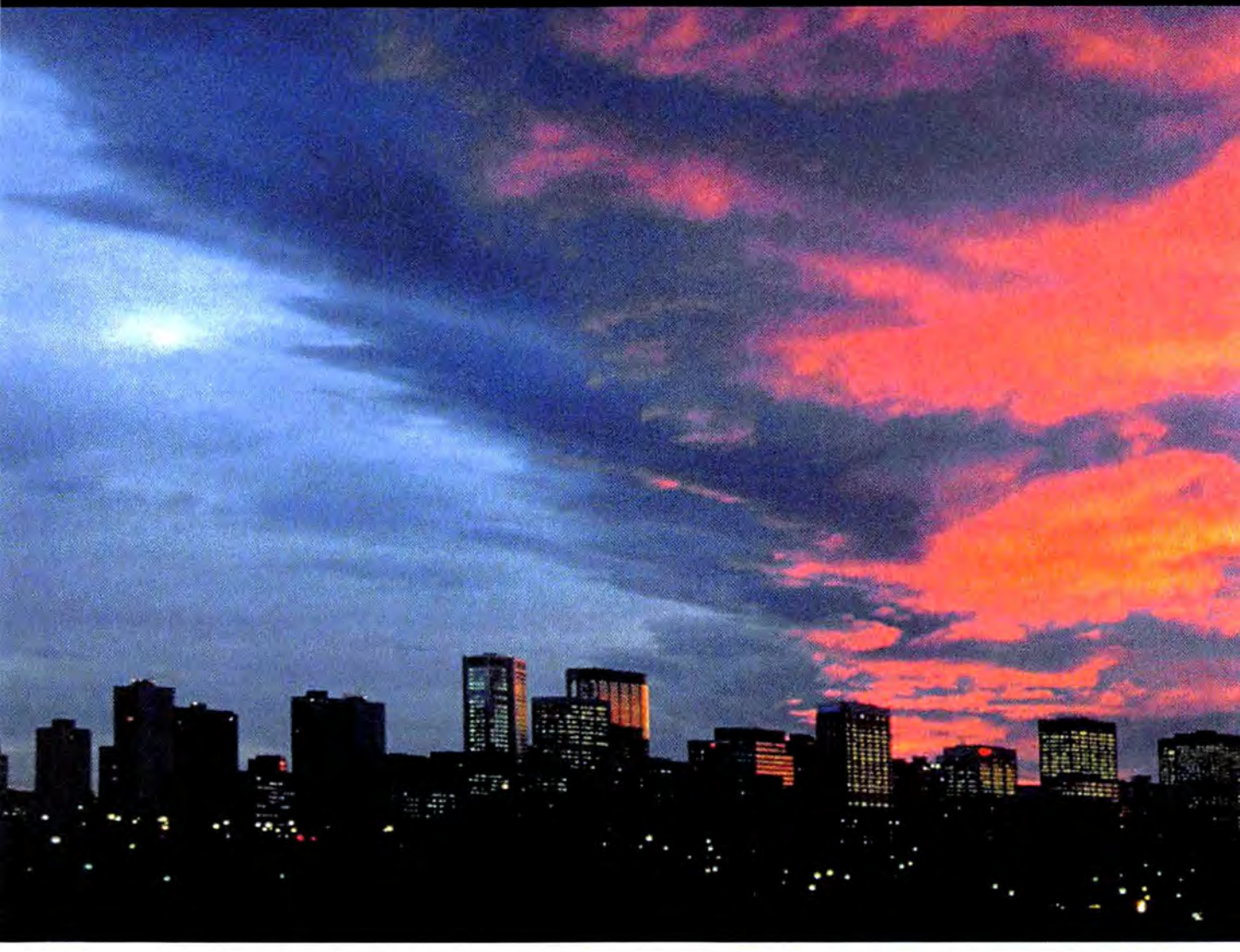

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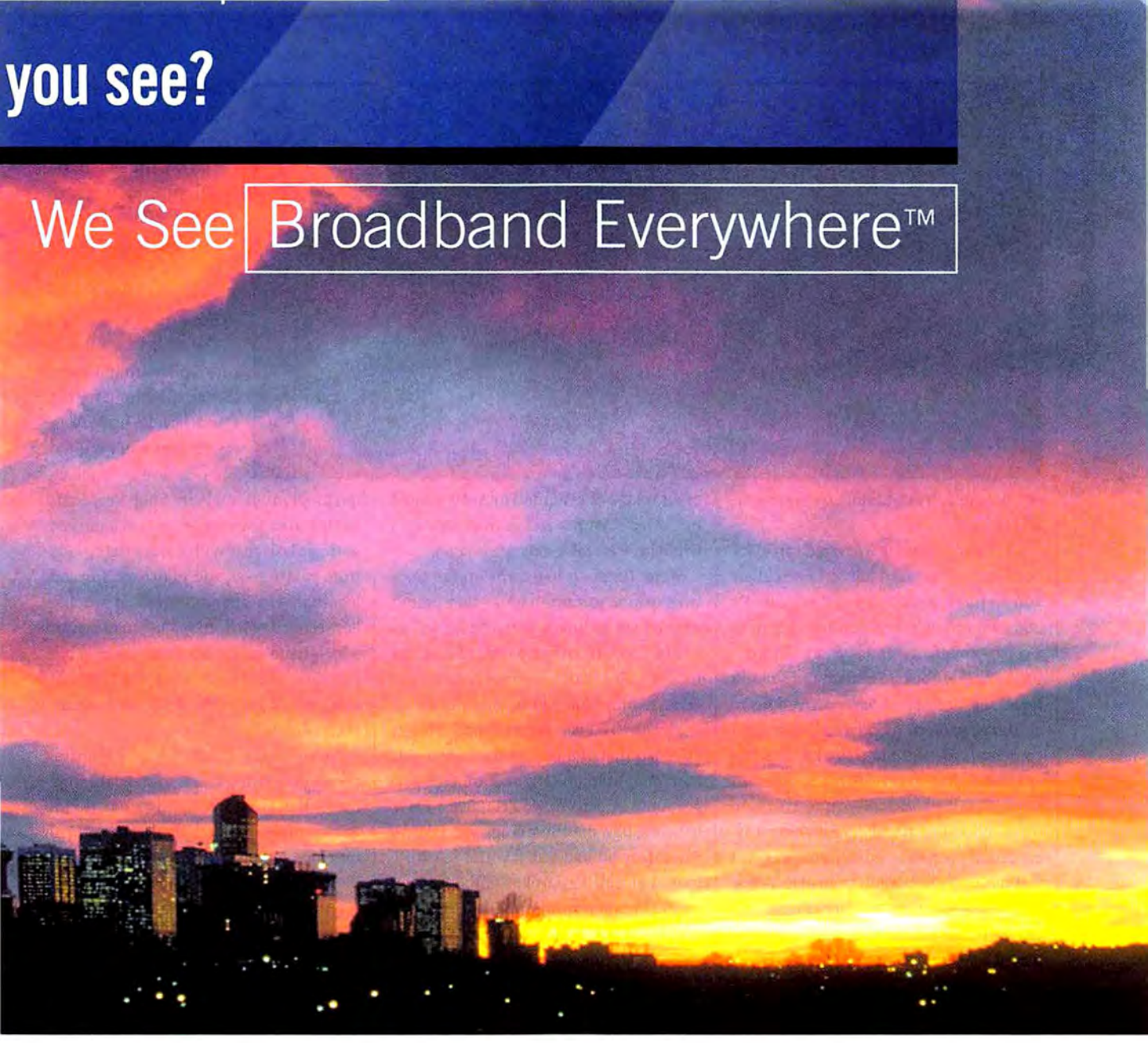

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SELECTION THE LACK OF A COLOR PICKER selection tool in Corel Custom Photo meant we had to draw a selection around the background trees before we could adjust their brightness and contrast. Notice the sharp delineation between the foreground trees on the left and the background.

ers, masking, text addition, transparency, and cloning.

All the applications we tested can stack portions of images in *layers*. Layers allow you to put a person's head on a dog's body, for example, and retain each part of a composite image as a separate, individually editable object. Similarly, *adjustment layers* apply color and other corrections to an image without modifying the original content. Jasc Paint Shop Pro handles layers best; it lets you create many different types of layers and apply lots of effects to them. PhotoImpact falters a bit here: Layers remain separate, editable objects, but you can't select a portion of an object once you've placed it on another image. For example, in our test image, once we placed a picture of a man on top of an image of a White House, we could not select just his jacket (but we could while he was still a separate image).

Masks function like tarps on the floor when you're painting a wall—they protect a portion of an image from change so you while you edit other parts. Masks are more flexible than selections because you can use other tools to modify the mask. For example, if you want to apply a funky effect so that one part of the image gets 100 percent treatment and another part gets only 25 percent, you can use a mask to define how the effect is applied. Ulead's PhotoImpact had our favorite masking tool: A simple keystroke combo lets you toggle between mask mode and normal view. Less appealingly, Micrografx Picture Publisher goes overboard with masking—you can't correct an image's color or add text without masking first. Even worse is ScanSoft's PhotoFactory, which won't allow you to select any part of an image, so you always have to use a mask.

The ability to put text into a photo might seem like an afterthought, but it's a handy feature to have if you don't want to rely on a desktop publishing program. Jasc's Paint Shop Pro, a star in this area, can write text on a curved path, splash text with colors that grade from pale to vivid, and adjust kerning and leading (vertical and horizontal spacing between letters). ScanSoft's PhotoFactory, which handles text better than any other program, adds elegant drop shadows that you can match to the drop shadows on other objects.

Transparency, another handy feature, allows underlying layers to show through layers that would normally cloak them. For example, you can place your company's logo on top of a portion of an image but still see the image underneath. All of the 12 applications discussed here allow transparency, and most of them enable you to use transparency within a

glossary for glossies

HERE ARE THE top terms you'll need to know when working with any photo editor.

CMYK: Short for cyan, magenta, yellow, and black (K is used to prevent confusion with blue). Most printing presses combine inks in these four colors to give the illusion of many different shades. Some presses use six colors or more.

Layer: Stacked elements in an image. Layering allows you to edit elements such as images, graphics, and text separately from each other.

Mask: A tool that protects areas of an image. Masking permits you to apply an effect to one specific part of an image or to vary the strength of an effect within an image.

Path: A representation of a border that surrounds an object to identify a selection. The path shows where an effect will be applied, and it can provide a guide for typing text.

Resampling: A process that reduces an image's resolution while maintaining the image's height and width. To resample, the program subtracts or blends pixels. When you are preparing images for the Web, resampling can shrink file sizes so that visitors to a site can download the images faster.

RGB: Short for red, green, and blue. Your monitor displays multiple colors based on the RGB method. The monitor fires electrons at the tiny red, green, and blue phosphors that coat the inside of your monitor screen, and your eyes blend the colors to give the image the appearance of many hues.

Selection: A designated portion of an image to which an effect can be applied. If you wanted to change the color of the paint on a picture of a house, you'd select the exterior walls with a tool such as a magic wand or a lasso.

Tolerance: A setting that determines how choosy a selection tool will be in matching the criteria you specify. For example, a low-tolerance setting in a color-picking tool selects only a narrow range of colors.

Transparency: An effect in which the image editor varies the opacity of an image element so that underlying elements can show through.

tool so that you can apply effects gradually.

Another handy tool is a *cloner*, also known as a rubber stamp. A cloner can duplicate large portions of an image or remove blemishes by copying "clean" pixels over "dirty" ones. Several apps also offer an automatic global dust remover, but this tool tends to blur the entire photo. Ulead's PhotoImpact cloner works especially well, because it lets you build the effect by holding down your mouse button, rather than by clicking repeatedly, as other apps do). PhotoImpact can use many different types of brushes, too, such as crayon or chalk; the others offer different brush shapes, but not brush media options.

The image editor you choose may depend on where you want your images to end up. Different products do a better job of optimizing for printing on an ink jet printer, posting to the Web, or professional printing.

RED EYE MOST IMAGE-EDITING APPLICATIONS offer tools to fix flash-induced red eye (left). But Microsoft's Picture It (middle) offers little control over how the fix is applied, and it produces an opaque black spot over the pupil. In contrast, Brøderbund's The Print Shop Photo Pro (right) lets you gradually paint over just the red pixels—it protects the iris and white of the eye—resulting in a much more natural look.

YOU'VE GOT PICTURES—NOW WHAT?

ONCE YOU'VE PUT the finishing touches on your masterpiece, you'll want to show it off. The image editing features to use for this depend on whether you want to send the image to your ink jet printer, post it to a Web site, or have it printed professionally. (For tips on how to prepare your file for each destination, see www.pcworld.com/augoo/image.)

The destination you choose for your picture will determine which image formats your image editor must support. All the applications we tested can import and export several formats, including the high-quality .tif format and the scalable .jpg format, which can produce good prints or small file sizes for posting on the Web. Several of the programs even import Photoshop files, though none retain image layers or other sophisticated features contained within those files.

On the other hand, few image editors can import EPS graphics files created in a vector-based drawing program such as Adobe Illustrator or Macromedia Freehand. In these programs, graphics look razor-sharp at any magnification. But when you import an EPS file into an image editor, you must convert it and choose the resolution at which you want it to appear. Only Adobe Photoshop LE 5, Jasc Paint Shop Pro, and Microsoft PhotoDraw can import EPS graphics (and PhotoDraw garbled every one we tried). Microsoft says PhotoDraw can't import EPS files created with later versions of Adobe Illustrator.

When it's time to print professionally, you'll want an app that handles CMYK color mode. By default, all editors work in RGB (red, green, blue) mode, because your monitor displays those colors. Several can import CMYK files and convert them to RGB, and others can separate files into CMYK channels for importing into a desktop publisher. Only Micrografx Picture Publisher lets you create a single-file CMYK image that you can send to a print shop without going through a desktop publisher. With the others, you must ask the shop to convert the file for you before printing. That task may cost extra, and you may be surprised by the final image's colors—a rich royal blue may shift to a muddy gray-blue, for example.

If you intend primarily to send images to a Web site, you need only RGB mode. Every package we saw can save images as Web-friendly .jpg or .gif files. Adobe's PhotoDeluxe offers a filter that cleans .jpg images, and though it's hard to distinguish its effects from those of a blurring tool, it makes the image look better. Ulead's PhotoImpact has an extensive, easy-to-use tool for resampling (reducing photo resolution) and color optimizing; you'll need it to shrink file sizes so that site visitors can download images faster.

Most image editing applications can easily export your images as a Web page. This offers a useful means of posting images to your site if you don't own an HTML editing program. Hit a button or choose a menu command, and the applications create a simple Web page with the image name above or below it. Several products, including ArcSoft's Photo Studio, Micrografx's Picture Publisher, and ScanSoft's PhotoFactory, can create photo albums to post online. Of these tools, PhotoFactory's produces the best results, with beautiful templates that make albums especially simple to create.

Any of the 12 programs can improve your images. If you're a beginner, you may be tempted to choose a wizard-dominated program. But if you use it extensively, the wizards will soon get in the way. Our advice: Choose a robust, less wizard-guided application such as our Best Buy, Ulead's PhotoImpact. Though it'll take more effort to learn, it will be less cumbersome and more flexible.

online *Find product reviews and publishing tips at PCWorld.com (www.pcworld.com/augoo/image). Alan Stafford is a senior editor at* PC World. ■

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Joe Swern is always on the lookout for Web sites that deliver great customer service. As the vice president of service and support for an Indianapolis, Ind.-based management software firm, his job is to help small and midsize businesses move their support operations to the Web while maintaining high levels of customer satisfaction. Recently, Swern discovered Crucial.com, a leading site for buying RAM on the Web.

"A lot of thought has obviously gone into designing and delivering their Web store," Swern says. "And I know how hard that is to do well. Crucial delivers great e-service."

Crucial.com, a division of chip maker Micron Technology, Inc., is the only DRAM manufacturer that ships memory directly to its customers. The manufacturer tests all of its modules under extreme temperatures, voltages, and operating conditions before selling them through Crucial.com's Web site and telephone sales service. Through Crucial, users can purchase the same modules that PC makers Gateway, IBM, and HP build into their base systems.

Swern first bought RAM from Crucial to upgrade his home PC. "I had tried to buy it locally," he says, "but most vendors insisted that I tear open my computer just to tell them what I needed. Then a friend directed me to Crucial.com. The site told me what my system required right there on the spot."

Shoppers can learn everything they need to know about upgrading their systems at the Crucial.com Web site. The site's unique Memory Selector walks users through the process of identifying the exact RAM their PCs require. Customers simply enter their computer's make and model information, and the Memory Selector returns a list of Crucial memory upgrades that are guaranteed to be compatible with that system.

Swern regularly refers to the performance benchmark results for Crucial.com's RAM in the site's Comprehensive Windows® 2000 Upgrade Guide, which recommends RAM for performance PCs, lists answers to frequently asked questions, and offers information on hardware and software requirements. "The key thing for me about Crucial is that all of the questions you would logically ask are answered on the Web site," Swern says.

Swern is also "especially impressed with Crucial's order-tracking link," which he uses to check on the shipping status of his orders. For his own PC, Swern was able to use Crucial.com's Web Order Tracking System to track an order from the Micron factory straight to his home. "I could find out at every instant where my order was," he says. "I could see that it left the FedEx office in Indianapolis at 7 AM, and that my wife signed for it at home later that morning."

Swern has been so impressed by the ease of ordering RAM from Crucial.com that his company now purchases memory upgrades there, too. "Crucial is right on target for delivering excellent sales and support on the Web," he says. "With its step-by-step RAM configuration process and streamlined ordering and tracking, I can get the right RAM for my PCs without ever having to pick up the phone."

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[*Genius.*]

It's astonishing how much faster this machine suddenly got with the addition of a mere 32MB! It behaves like it just got a megadose of vitamins and joined a health club.

John Brawley, Crucial Customer

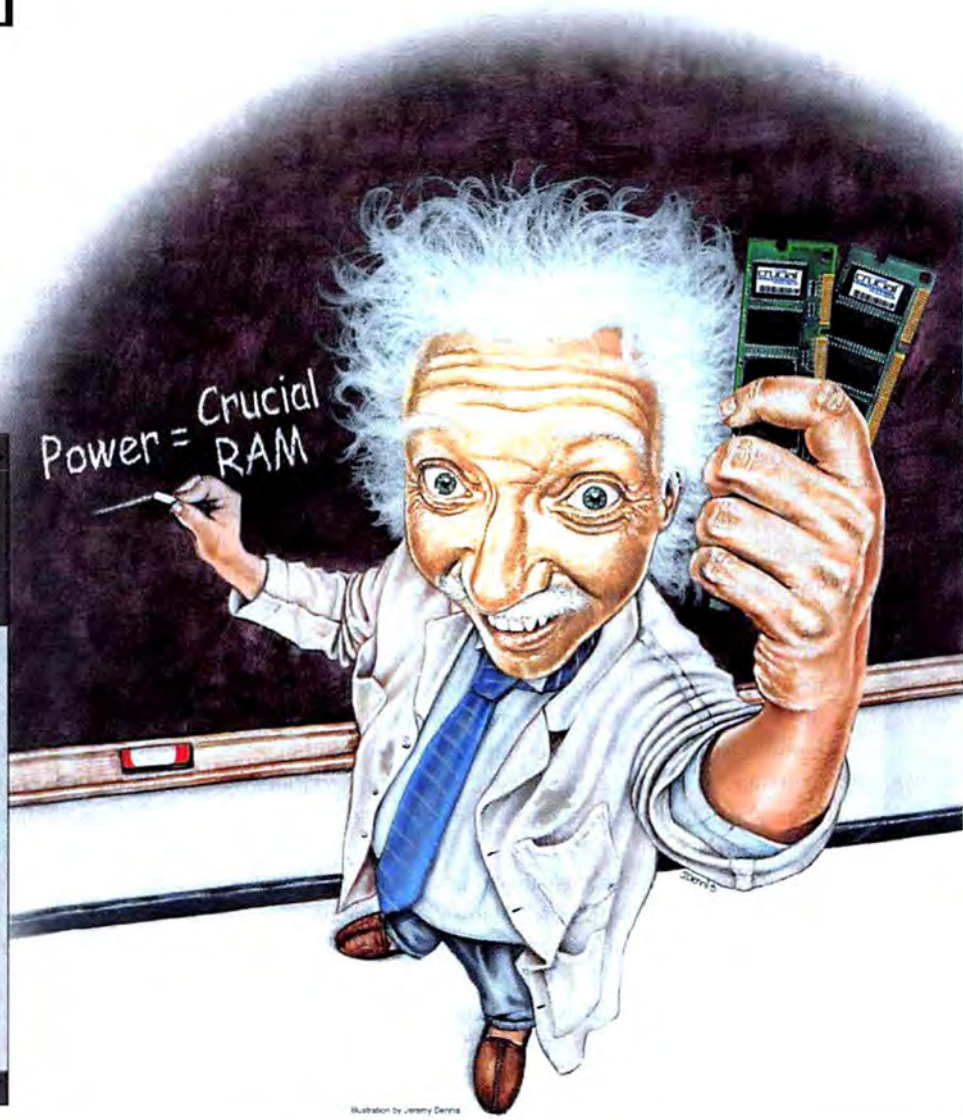

Illustration by Jeremy Dennis

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HP	Kingston	**Crucial**
Pavilion 4530	$126.00	$57.59
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Kayak XU PC Workstation 440BX Chipset	$143.00	$71.99
Vectra VL Series 8	$114.00	$57.59
Apple	Kingston	**Crucial**
Power Mac G3 PC100	$126.00	$57.59
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Crucial prices reflect an automatic 10% discount for ordering online. Prices were taken from Crucial and Kingston Web sites on 6/2/00; however, they can (and do) change daily. Prices may vary according to specific system requirement.

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If extra-terrestrials looking for high-performance PCs approach you with the order, "Take me to your leader," you'd do well to guide them to Alienware Corporation. Just look at some of the comments customers have posted on Alienware's web site:

"I just want to thank you for such a well-built product," says Marty. "My new Area 51 computer is truly 'all that and a bag of chips.'...I will be referring your excellent company to my friends who are looking for a computer system that is a cut above the rest."

Another user, David Shor, writes, "Thank you, guys, for building the best system money can buy! There are no false claims about performance level. The machine I got from you just *smokes*."

"Alienware, you are supreme," gushes Jack Powell. "I am now on my second Alienware system.... I fell in love with the first and am now in love with this one. There is no better-built computer on the market, and the components are absolutely cutting-edge.... I wouldn't consider buying a computer system from someone else."

"I have never had the pleasure of using a machine that was built to such perfection," Mario Viscardi adds. "The speed of the machine is amazing!"

Users aren't the only ones enthusiastic about Alienware's computer systems. "Alienware's top-of-the-line system packs a lot of brand-name punch into a reasonably priced package," writes *PC Gamer*, which has given Alienware its Editor's Choice award every year for the past three years. Alienware also won *Maximum PC*'s "Kick-Ass Award" and was described by that magazine as "the fastest PC we've ever seen, bar none!"

Alienware's success is due in part to its vision of building high-performance computer systems that go beyond word-processing and net-surfing capabilities to include full-blown multimedia options. The company strives to use the latest 3D accelerators and the best hardware possible, allowing users to custom-configure their systems by choosing the best brand-name components.

The South-Florida-based company, which was recently named a Microsoft System Builder Gold Member, prides itself on its customer service and support, which is also praised by its customers.

"The minute I began talking to your service reps, I knew I was in good hands," explains Michael Cooke. "They made me feel confident in the product I was purchasing, offered suggestions, and gave their input on the hardware.... Keep up the good work and keep setting the standards for what should be expected from any company."

Abraham Egnor says, "I love you guys. I sent you a message about losing the Software DVD player. I expected to get a reply sometime this week, maybe asking me for more info. Instead I got a reply the next day, with the software attached. Two words: jaw droppage. And it works. I'm not used to things going this well, especially where computer problems are concerned."

High performance, service, and support. It's no wonder many consider Alienware "out of this world."

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It's summertime, and Washington's apple harvest is entering its full swing. At Snokist Growers, a Yakima, Wash.-based agricultural cooperative, one thousand temporary workers are starting to sort the Grannies from the Galas, and the JonaGolds from the Golden Delicious. Susie Deardorff, the co-op's coordinator of technology, seems unfazed by this spike in Snokist's operations. "This is a seasonal business, and the pace varies," she says. "You get used to it."

Even in winter, when Snokist's ranks shrink to just 500 people, Deardorff looks after hundreds of PCs and peripherals used to track financial, production, and time-keeping data. She also makes Snokist's IT purchases—at CDW.com, the number-one direct seller of Compaq, Computer Associates, Microsoft, Toshiba, and other top brand name manufacturers.

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Snokist starting shopping at CDW six years ago, when IT saw the opportunity to streamline the co-op's purchases and save money. "Before we started shopping at CDW, we were ordering equipment piecemeal from several vendors," Deardorff says. "The great thing about CDW is that it gives us much more control over our pricing than the others ever did."

Deardorff often buys printer supplies, network hubs, and modems through CDW@work, CDW's B2B extranet service. While Snokist automatically qualifies for volume discounts with CDW@work, Deardorff relies on her designated account manager to get her a good price when she's in a hurry. "If I need something immediately, it's easy to reach my account manager on the phone or via email," she says.

Now Deardorff spends even less time waiting for the price quotes her account manager sends via fax, email, or telephone. Through CDW@work's new Quote feature, she can move fast on the up-to-the-minute pricing information he provides her online. "This is just another great way to connect with my account manager, who has always been exceptionally responsive to our needs," she says.

Snokist also receives excellent customer service from CDW whenever it returns an item. "They've been very good at handling returns," says Deardorff. "They go out of their way to make sure that we're taken care of quickly, and without a hassle." As a high-volume CDW@work customer, Snokist qualifies for high-touch customer service from CDW's E-Support team. From 9 AM to 5 PM, Monday through Friday, Deardorff can communicate in real time with an E-Support specialist simply by choosing the Chat feature on CDW's checkout and Account Team pages.

CDW is now broadening its offerings to include telephony products and services from AT&T, UUNET, Sprint, and Lucent Technologies. The vendor has created a dedicated account team to help its customers choose the right phone systems for their businesses. And customers can learn even more by checking out CDW's live monthly webcasts, the Customer Technology Seminars, which feature presentations by key personalities at CDW's major business partners. (Toshiba, Microsoft, and Compaq have already participated.)

Deardorff says she would definitely trust a telephony solution from CDW. "We are in the process of reviewing our front-office functions, and we will certainly be looking at what CDW has to offer in that area," she says.

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A monthly update of the best desktop PCs, notebooks, printers, monitors, graphics boards, and modems

PC WORLD

TOP 100

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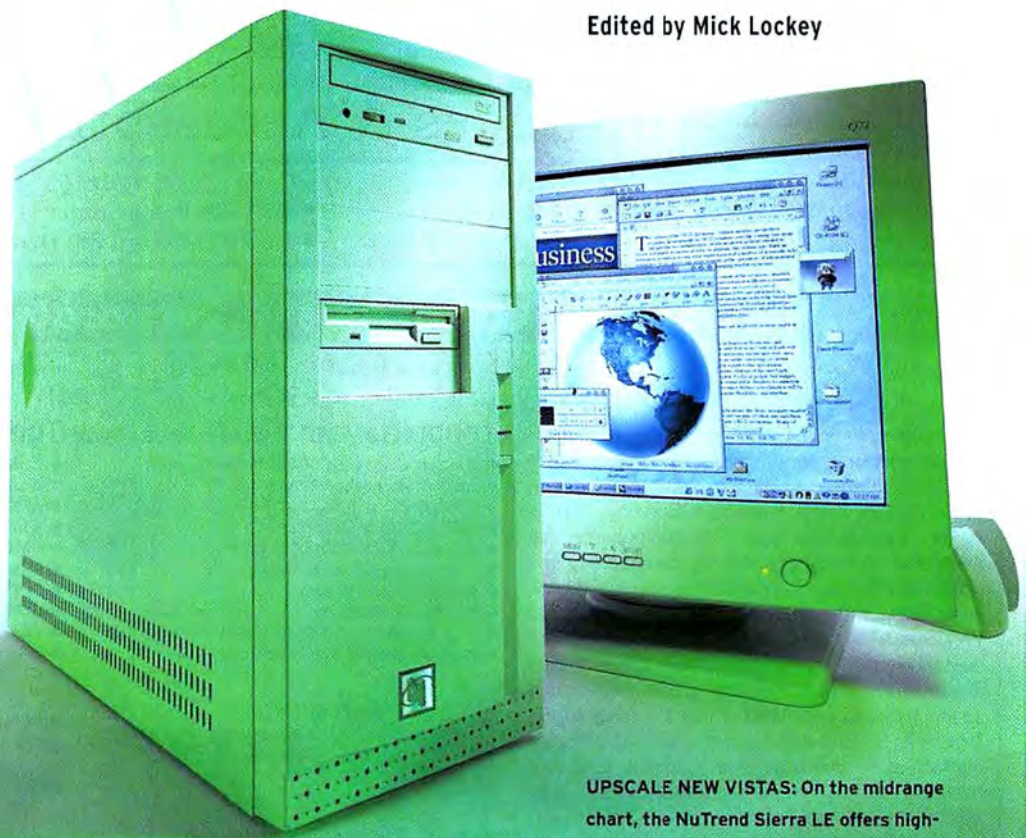
big values from small vendors

Edited by Mick Lockey



UPSCALE NEW VISTAS: On the midrange chart, the NuTrend Sierra LE offers high-end features for a low-end price.

WHILE NAMES SUCH as Axis, Micro Express, and Quantex may not register as strongly as brands like Dell, IBM, and Gateway, many of these smaller vendors sell desktop systems that would impress even the most brand-loyal fan of big-name machines. Packed with high-end features and topflight warranties, PCs from some less-familiar manufacturers offer enough value to place high in our Top 30 charts—and even dominate one of them.

Although Dell holds the top two spots in our power chart and the number one in our midrange Top 10, Micro Express is number two among midrange PCs and Axis and Micron are at four and five on the power Top 10. Most impressively, the first eight slots in our budget chart belong to smaller vendors.

THE LEXMARK Z52 COLOR Jetprinter debuts in Best Buy territory with a terrific price and fast performance.

What launches these systems onto the charts? Price, for one thing: Smaller manufacturers—with smaller marketing budgets—often pass cost savings along to their customers. In addition to generous warranties and technical support hours that rival those of the big dogs, strong performance helps bring them to the forefront. Several smaller companies, including Axis and Micro Express, offer four- or five-year system warranties—better than Dell's and Gateway's three-year coverage.

However, fewer people own products from the lesser-known vendors than from big-name companies, and *PC World* bases its reliability and service ratings on feedback from readers who own the systems. That means we have a harder time establishing track records in these areas for the small fry. Also, bigger companies have bigger tech support teams, so calling a smaller vendor for help might mean encountering longer hold times.

online POINT YOUR browser to www.pcworld.com/top400 for late-breaking reviews on desktop computers. In the Top 400 section, you'll find comprehensive reviews and ratings. You'll also find details on the PC WorldBench 2000 test suite at www.pcworld.com/benchmark.

DOT PITCH CONFIDENTIAL

WHETHER MONITORS use stripe pitch or dot pitch technology to display text and graphics, prices are sliding downward. That's excellent news for buyers on tight budgets. But should you pay the average $150 premium for a state-of-the-art flat-screen CRT (which uses stripe pitch technology) on the reasoning that stripe pitch is cheaper than it was six months ago? Not according to our chart, where "old school" dot pitch CRTs deliver the best value. Eight of the 19-inch monitors on this month's Top 10 use a dot pitch tube, and six of these cost less than $400—about $50 less than last August's 17-inch Best Buys. You won't forgo image quality with these displays, either: Most monitors in this price range earned at least a Very Good on our text and graphics tests.

SPRINTING PRINTER

NEED A PRINTER to output the sharp text and bright graphics you're seeing on your spiffy 19-inch monitor? Look no further than this month's *Top 10 Printers* chart, where Lexmark's new Z52 Color Jetprinter earns a Best Buy. It sprints through text at 5.4 pages per minute—near the top speed for any ink jet printer—and at just $179, the price is right. The Lexmark produces light, sharp text and smooth, crisply detailed images. The Z52 is an all-around excellent choice whether you work with text or with more-demanding graphics.

Freelance writer Joel Strauch and PC World *editors Lisa Cekan, Katharine Dvorak, Mick Lockey, Kalai Murugesan, Kalpana Narayanamurthi, Karen Silver, and Alan Stafford contributed to this month's Top 100. Testing performed by Curt Buehler, Ulrike Diehlmann, Robert James, Elliot Kirschling, Jeff Kuta, Thomas Luong, Sean Tieu, and John Tjon of the PC World Test Center.* *See page 16 for contact information.* ▶

YOUR GUIDE TO THE TOP 100

QUESTIONS ABOUT OUR CHARTS? The following information should answer them.

How do the charts work? Each month we test a large number of PCs, printers, scanners, monitors, graphics boards, and modems, and compare them with previously reviewed products. Only the best products land on the Top 10 and Top 15 charts, which are refreshed monthly. System configurations are shown as tested. Vendors may have since changed components.

What does the overall rating mean? This 100-point scale reflects results from our hands-on evaluations and performance tests. A score in the 90s is exceptional, while one in the 70s is above average.

What does the PC WorldBench 2000 score mean? It's a measure of how fast a PC can run a mix of common business applications as compared with our baseline machine, an HP Pavilion 8380 with a PII-400 CPU, 96MB of RAM, and an 8GB hard drive. For example, a PC that scores 200 is twice as fast as the baseline system.

Where do the scores for reliability, support quality, and support policies come from? Reliability and support quality scores are based on surveys of *PC World* readers and on anonymous support calls made by *PC World* staff. The policies score is based on vendor support policies.

PHOTOGRAPHS: MARC SIMON; ICONS: JEFFREY PELO; COMPUTER SCREEN GRAPHICS: JOHN GODDARD

PC WORLD

TOP 10 POWER PCs

	SYSTEM: $2000 AND OVER	Month tested	★ Overall rating	Street price (5/15/00)	PC WorldBench 2000 performance score [1] Faster	Base configuration
1	Dell Dimension XPS B800r 800/388-8542 www.dell.com	May 00	99	Average: $2619	Outstanding 201	Outstanding: Pentium III-800EB, 128MB of RDRAM, 256KB L2 cache, 20.4GB hard drive, 19-inch monitor, Windows NT 4.0
2	Dell OptiPlex GX300 800/388-8542 www.dell.com	May 00	98	Expensive: $2789	Very good 165	Outstanding: Pentium III-733, 128MB of RDRAM, 256KB L2 cache, 20GB hard drive, 19-inch monitor, Windows 2000 Pro
3	Gateway GP7-800 800/315-2536 www.gateway.com	June 00	97	Very inexpensive: $2014	Very good 156	Outstanding: Pentium III-800, 128MB of SDRAM, 256KB L2 cache, 30GB hard drive, 19-inch monitor, Windows 98 SE
4	Axis Systems Terra AXD 800/378-9014 www.axissys.com	July 00	97	Inexpensive: $2299	Very good 194	Outstanding: AMD Athlon-850, 256MB of SDRAM, 512KB L2 cache, 30.7GB hard drive, 19-inch monitor, Windows NT 4.0
5	Micron Millennia Max 800 800/642-7667 www.micronpc.com	May 00	97	Inexpensive: $2299	Good 149	Outstanding: Pentium III-800EB, 128MB of SDRAM, 256KB L2 cache, 30GB hard drive, 19-inch monitor, Windows 98 SE
6	Quantex SM800sx 800/352-4051 www.quantex.com	June 00	94	Very inexpensive: $2000	Good 148	Outstanding: Pentium III-800EB, 128MB of SDRAM, 256KB L2 cache, 30GB hard drive, 19-inch monitor, Windows 98 SE
7	Sys Performance 850A 800/613-9963 www.sys.com	June 00	94	Average: $2559	Outstanding 198	Outstanding: AMD Athlon-850, 128MB of SDRAM, 512KB L2 cache, two 20.5GB hard drives, 19-inch monitor, Windows NT 4.0
8	ABS Performance VL 800/876-8088 www.buyabs.com	April 00	93	Inexpensive: $2199	Good 151	Outstanding: Pentium III-700, 256MB of SDRAM, 256KB L2 cache, 27.3GB hard drive, 19-inch monitor, Windows 98 SE
9	Polywell Poly 800K7 800/999-1278 www.polywell.com	May 00	90	Inexpensive: $2275	Good 151	Outstanding: AMD Athlon-800, 128MB of SDRAM, 512KB L2 cache, two 13.5GB hard drives, 19-inch monitor, Windows 98 SE
10	NuTrend Athlon Ultra 2 888/482-6678 www.nutrend.com	NEW	89	Inexpensive: $2209	Good 146	Outstanding: AMD Athlon-850, 128MB of SGRAM, 512KB L2 cache, 30GB hard drive, 19-inch monitor, Windows 98 SE
	Best Buy	Percent of overall rating ▶		Price: 15 percent	Performance: 20 percent	Base configuration: 10 percent

[1] A system's performance word score is relative to the scores earned by other PCs running the same operating system. For more details, see "Your Guide to the Top 100" on page 183.

[2] We define vertical cases as towers (taller than 20 inches), midsize towers (15.5 to 20 inches), or minitowers (shorter than 15.5 inches); and horizontal cases as desktops (5 inches or taller) or compacts (shorter than 5 inches).

YOU MAY WONDER what happened to systems with the heralded 1-gigahertz processor, as none appear on our chart. Last month one 1-GHz system, the Gateway Select 1000, edged into a spot, but it has dropped off due to a price increase. Taking its place at number ten is NuTrend's Athlon Ultra, a newcomer that offers acceptable CPU performance and top-notch features. The Dell Dimension XPS B800r holds steady in the top spot.

1 DELL DIMENSION XPS B800R

WHAT'S HOT: Throw a Pentium III-800 CPU into a Windows NT 4.0 machine, and you've got rip-snorting speed: This Dell's score of 201 on our PC WorldBench 2000 test suite is the highest attained by any NT system we've seen. Top-drawer extras include an 8X/4X/32X CD-RW drive, an Iomega Zip 100 drive, both a modem and a network card, and Microsoft Office 2000 Small Business Edition.

WHAT'S NOT: Although Dell provides ample documentation for the standard equipment, our unit lacked paperwork for some extra components. A $116 price drop makes the system more affordable, but it's still the second most expensive machine on the chart.

WHAT ELSE: This PC uses high-speed Rambus DRAM (RDRAM), which is designed to rev up memory-intensive apps. You'll also rev up the overall cost of the system if you upgrade the RAM in the future, as this type of memory is expensive. Despite all of its add-in goodies, the XPS B800r still provides two open PCI slots and three open bays in its neat interior. You also get a quick-setup manual and a thick troubleshooting guide.

BEST USE: For users who must have everything—regardless of sticker price—this Dell looks like a million bucks.

2 DELL OPTIPLEX GX300

WHAT'S HOT: Dell trims $159 off the sticker price from last month, moving the OptiPlex GX300 up into Best Buy territory. Running Windows 2000 Professional, it posted a PC WorldBench 2000 score of 165, trailing the Windows NT machines but outpacing all the Win 98 systems on the chart. A tidy interior provides chassis intrusion detection, a case lock, a swing-out power supply, five open PCI slots, and three open (and toolless) drive bays. Dell's 19-

Extra features	Design and expandability [2]	Vendor's system reliability	Tech support quality/ policies	Tech support (hours/days, charge)	Warranty for parts/labor (years)
Outstanding: Celestica NVidia GeForce 256 graphics card with 32MB of SDRAM, 8X/4X/32X CD-RW drive, V.90 modem, network card, Iomega Zip 100 drive, Microsoft Office 2000 SBE	**Good:** includes top-notch monitor; midsize tower; 3 open drive bays, 2 open slots	Outstanding	Good/ Good	24/7, toll-free	3/1
Very good: NVidia GeForce 256 graphics card with 32MB of SGRAM, 8X/4X/32X CD-RW drive, network card, chassis intrusion detection, case lock, Wake on LAN, Microsoft Natural Keyboard	**Good:** swing-out power supply; midsize tower; 3 open drive bays, 5 open slots	Outstanding	Good/ Outstanding	24/7, toll-free	3/3
Good: NVidia Riva TNT2 Pro graphics card with 32MB of SDRAM, 20X-48X CD-ROM drive, network card, Microsoft Office 2000 SBE, Microsoft IntelliMouse	**Good:** easy access to memory sockets; tower; 6 open drive bays, 3 open slots	Good	Fair/ Outstanding	24/7, toll-free	3/3
Very good: Creative Labs 3D Blaster Annihilator Pro graphics card with 32MB of DDR SGRAM, 16X DVD-ROM drive, 8X/4X/32X CD-RW drive, V.90 modem	**Good:** easily removable case; midsize tower; 2 open drive bays, 3 open slots	[3]	Good [3]/ Outstanding	24/7, toll-free	5/3
Good: NVidia GeForce 256 AGP graphics card with 32MB of SDRAM, 12X DVD-ROM drive, V.90 modem, case lock, Microsoft Office 2000 SBE	**Very good:** roomy case; midsize tower; 5 open drive bays, 4 open slots	Good	Fair/ Outstanding	24/7, toll-free	Varies [4]/3
Good: NVidia GeForce 256 AGP graphics card with 32MB of RAM, 12X DVD-ROM drive, V.90 modem, Iomega Zip 250 drive, Corel WordPerfect Office 2000	**Good:** multimedia keyboard; minitower; 3 open drive bays, 4 open slots	Fair [3]	Fair [3]/ Good	24/7, toll-free	3/1
Good: Matrox G400 Max graphics card with 32MB of RAM, 17X-40X CD-ROM drive, network card, case lock, RAID card	**Very good:** room for expansion; midsize tower; 4 open drive bays, 3 open slots	[3]	Good [3]/ Good	24/7, toll-free	Varies [5]/5
Outstanding: ATI Rage Fury Maxx graphics card with 64MB of SDRAM, 8X DVD-ROM drive, 4X/4X/32X CD-RW drive, V.90 modem, Microsoft Office 2000 SBE, microphone	**Good:** front-mounted MIDI inputs; midsize tower; 2 open drive bays, 4 open slots	[3]	Fair [3]/ Outstanding	24/7, toll-free	3/Lifetime
Very good: NVidia GeForce 256 AGP graphics card with 32MB of SDRAM, 8X DVD-ROM drive, V.90 modem, Iomega Zip 100 drive, Lotus SmartSuite Millennium, RAID card	**Good:** one-piece case slides off easily; minitower; 3 open drive bays, 3 open slots	[3]	Fair [3]/ Good	24/7, toll-free	3/5
Good: Creative Labs 3D Blaster Annihilator Pro graphics card with 32MB of DDR SDRAM, 8X DVD-ROM drive, V.90 modem, Corel WordPerfect Office 2000	**Good:** easy-access sockets and CPU; mid-size tower; 4 open drive bays, 3 open slots	[3]	Fair [3]/ Good	24/7, toll-free	3/Lifetime
Extra features: 10 percent	Design and expandability: 15 percent	Reliability: 15 percent	Support and warranty: 15 percent		

[3] Insufficient data to give a rating, or the rating is derived from the vendor's Reliability and Service survey scores for its home PCs. For tech-support quality, this rating may also depend on our anonymous support-quality calls.

[4] Five years on CPU and main RAM, three years on other parts.

[5] Six years on CPU and main RAM, three years on other parts.

inch UltraScan P991 flat-screen CRT monitor delivers vibrant colors and crisp text at resolutions up to 1600 by 1200.

WHAT'S NOT: Even with its price cut, this OptiPlex costs more than any other system on the chart. Dell posts most of its documentation online; the print version of the main system manual contains only the bare minimum, and paper documentation for individual components isn't included (though you can order it for free).

WHAT ELSE: Despite the easy-service chassis, the memory slots are buried, and the system interior feels cramped until you swing the power supply out of the way. Thanks to the 8X/4X/32X CD-RW drive, making backups of critical or time-sensitive files is fast and easy.

BEST USE: For businesses that want to get started with Windows 2000 Pro as soon as possible, this OptiPlex offers a substantial bang, but be prepared to pay a lot of bucks for the privilege.

New on the Chart

10 NUTREND ATHLON ULTRA 2

NEW **WHAT'S HOT:** High-end multimedia features distinguish this system. For starters, the Lite-On 19-inch monitor delivers lush colors and sharp text, all the way up to 1600 by 1200 resolution, thanks in part to the Creative Labs 3D Blaster Annihilator Pro graphics card. An 8X DVD-ROM drive and Creative's five-speaker FPS 2000 Digital stereo sound set complement the easy-on-the-eyes image quality. Inside the spacious midtower, three open PCI slots and four open bays provide excellent expansion room. Relatively inexpensive at $2209, the NuTrend also packs a generous 30GB hard drive.

WHAT'S NOT: You must remove two screws to gain access, but the side of the case slides off and back on smoothly. The system lacks individual component manuals for the video and sound cards, which would come in handy for troubleshooting. Typing can be a tad noisy, due to the keys' flimsiness. ▶

STILL EXPENSIVE, BUT: Dell's OptiPlex GX300 climbs up the chart and becomes a Best Buy, thanks to a $159 price cut.

PHOTOGRAPH: KEN SMITH

How Much Power Is Enough?

TECH TREND KNOW the wattage of your PC's internal power supply—this information can be valuable in preventing system lockups and slowdowns (the more peripherals you have, the more power you need to run them). To find the wattage, check the side of the power supply (inside the case) or refer to your manual. With smaller PCs—those with little room for adding peripherals—the power supply plays a lesser role. "You can get by with 135 to 150 watts with a small system," says Ken Lam, vice president of marketing at PC vendor ABS. But if you're using a high-end system and plan to upgrade someday, you'll want a bit more power behind it to support the extra load. Lam recommends at least 235 to 250 watts.

"With [systems in] the Pentium III family, 200 watts is the minimum you should have," says Brian Zucker, Dell's spokesperson for small business and consumer products. The 200-watt estimate has remained solid for several years, he notes, adding, "As the technology improves, power consumption often winds up going down."

Like the PIII, AMD's Athlon chip also has a big appetite for power. AMD spokesperson Drew Prairie acknowledges that fact: "With a high-end system—one using a GeForce graphics card, for example—it can't hurt to have a 300-watt power supply."

Adding other peripherals such as CD-RW drives and DVD-ROM drives can also cut into a system's power resources. "Our experience indicates that having a power supply that's too small can create problems," says Lam. "And with a bigger power supply, the system will be more stable." Most cases allow you to replace the current power supply with another one. It's an upgrade that usually involves more manual dexterity (with the screwdriver and such) than technical know-how.

WHAT ELSE: With an Athlon-850 processor inside, this Ultra earned a 146 score on our PC WorldBench 2000 tests—about average for similarly equipped systems. The software bundle includes Corel's WordPerfect Office 2000 and Grolier's Multimedia Encyclopedia.

BEST USE: With its solid performance and superb multimedia features, the NuTrend Athlon Ultra 2 would make an outstanding presentation machine for a small office.

HIGH FIDELITY: NuTrend's Athlon Ultra 2 offers a first-rate multimedia system for a reasonable price.

Also of Note

SO FAR, THE SYSTEMS we've seen with gigahertz processors usually don't offer enough of a power boost to offset their hefty prices and earn spots on our power chart. This can be true of computers with slightly slower processors as well. Our advice? Let prices cool down a little bit before you start investing in these gigahertz-level machines for your business.

Several new PCs we tested this month are cases in point.

Dell's 1-GHz Pentium III-1000 racehorse, the Dimension XPS-B1000r Special Edition, is a Windows 2000 system. It posted the highest PC WorldBench 2000 score we've seen for that operating system (178)—but its price of nearly $4000 sandbagged it, even when you count a tricked-out package that includes an 8X/4X/32X CD-RW drive, a generous 40GB hard drive, and an excellent 19-inch flat-screen display (the Dell UltraScan P991).

The Kingdom Excalibur PIII-850 also missed our chart. Its near-astronomical $3697 price is almost $700 higher than that of Gateway's Select 1000. The Kingdom has a slower processor—a PIII-850—and its 147 score on our PC WorldBench 2000 tests wasn't appreciably faster than the average score of PIII-700 systems we've seen. Nonetheless, it offers innovative technologies. The system's hybrid 4X DVD-ROM and 6X/4X/24X CD-RW drive saves you a drive bay—letting you record CDs and play DVDs in the same drive—and allows you to store your critical data on CD-ROMs. Still, we did have a few quibbles: The hybrid drive adds too much cost, and its less-than-cutting-edge performance mars its overall practical appeal. The flat-panel OptiQuest L700 monitor is flashy, but unless you have your heart set on a thin display, the small 15-inch screen size and relatively lackluster image quality aren't worth the extra cash outlay.

Somewhat more affordable, the Micron Millennia Max 866 costs a still-steep $2899, but it offers a PIII-866 CPU and many dual-performance options. With a 12X DVD-ROM drive and a 8X/4X/32X CD-RW drive, a modem and a network interface card, and Slot 1 and Socket 370 processor ports on the motherboard, this packed PC is ready for most office requirements, including a future upgrade of the CPU. But, as with the Dell and Kingdom systems, its price held it back. ▶

MORE REVIEWS ONLINE

online

WE EVALUATED the following systems along with the others, but they didn't score high enough to reach the *Top 10 Power PCs* chart. For write-ups, visit PCWorld.com (www.pcworld.com/t10pcs).

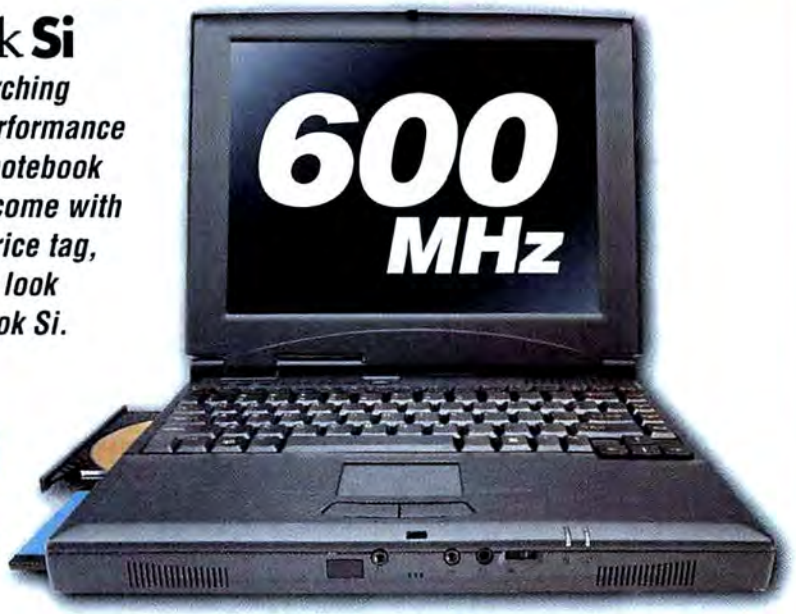
- **Dell Dimension XPS-B1000r Special Edition**
- **IBM PC 300PL**
- **Kingdom Excalibur PIII-850**
- **Micron Millennia Max 866**

PHOTOGRAPH ABOVE: KEN SMITH; BELOW: MARC SIMON

Small Price
Huge Value

WinBook Si

If you're searching for a high-performance multimedia notebook that doesn't come with a high-end price tag, take a closer look at the WinBook Si.



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PC WORLD

TOP 10 MIDRANGE PCs

	SYSTEM: $1200 TO $1999	Month tested	★ Overall rating	Street price (5/15/00)	PC WorldBench 2000 performance score [1] Faster	Base configuration
1	Dell Dimension XPS T600r 800/388-8542 www.dell.com	May 00	92	Average: $1489	Good 136	**Very good:** Pentium III-600E, 128MB of SDRAM, 256KB L2 cache, 20.4GB hard drive, 17-inch monitor, Windows 98 SE
2	Micro Express MicroFlex 850A 800/989-9900 www.microexpress.net	July 00	89	Very inexpensive: $1299	Outstanding 153	**Very good:** AMD Athlon-850, 128MB of SDRAM, 512KB L2 cache, 20GB hard drive, 17-inch monitor, Windows 98 SE
3	ABS Multimedia VL 800/876-8088 www.buyabs.com	NEW	89	Very inexpensive: $1279	Very good 143	**Very good:** AMD Athlon-700, 128MB of SDRAM, 512KB L2 cache, 20.5GB hard drive, 17-inch monitor, Windows 98 SE
4	CyberMax Enthusiast K7-750 888/853-2692 www.cybermaxpc.com	June 00	88	Average: $1599	Outstanding 154	**Very good:** AMD Athlon-750, 128MB of SDRAM, 512KB L2 cache, 20GB hard drive, 17-inch monitor, Windows 98 SE
5	Gateway Select 700sb 800/315-2536 www.gateway.com	July 00	87	Average: $1499	Very good 144	**Very good:** AMD Athlon-700, 128MB of SDRAM, 512KB L2 cache, 20GB hard drive, 17-inch monitor, Windows 98 SE
6	Micron Millennia Max 733 800/642-7667 www.micronpc.com	July 00	87	Average: $1699	Outstanding 148	**Very good:** Pentium III-733, 128MB of SDRAM, 256KB L2 cache, 20GB hard drive, 17-inch monitor, Windows 98 SE
7	Quantex SM667sx 800/352-4051 www.quantex.com	April 00	87	Inexpensive: $1349	Very good 138	**Very good:** Pentium III-667, 128MB of SDRAM, 256KB L2 cache, 20.4GB hard drive, 17-inch monitor, Windows 98 SE
8	Dell OptiPlex GX110 800/388-8542 www.dell.com	July 00	86	Average: $1705	Very good 140	**Good:** Pentium III-667, 128MB of SDRAM, 256KB L2 cache, 10GB hard drive, 17-inch monitor, Windows 98 SE
9	NuTrend Sierra LE 888/482-6678 www.nutrend.com	NEW	85	Inexpensive: $1459	Very good 142	**Very good:** Pentium III-733, 128MB of SDRAM, 256KB L2 cache, 20GB hard drive, 17-inch monitor, Windows 98 SE
10	Axis Systems Orion CXV 800/378-9014 www.axissys.com	May 00	84	Average: $1637	Good 132	**Outstanding:** Pentium III-600, 128MB of SDRAM, 256KB L2 cache, 20.5GB hard drive, 19-inch monitor, Windows 98 SE
	Best Buy	Percent of overall rating ▶		Price: 17 percent	Performance: 18 percent	Base configuration: 10 percent

[1] A system's performance word score is relative to the scores earned by other PCs running the same operating system. See "Your Guide to the Top 100" on page 183.

[2] We define vertical cases as towers (taller than 20 inches), midsize towers (15.5 to 20 inches), or minitowers (shorter than 15.5 inches); and horizontal cases as desktops (5 inches or taller) or compacts (shorter than 5 inches).

TWO NEW SYSTEMS jostle their way onto the chart this month. The ABS Multimedia VL earns third place with an attractive blend of solid speed and the lowest price in this Top 10. It's a good choice if you are not looking for the extensive software bundles offered by vendors such as Dell. The NuTrend Sierra LE also debuts; its performance closely matches that of the ABS, and it adds a few more features, but it also carries a higher price.

1 DELL DIMENSION XPS T600R

WHAT'S HOT: With a Pentium III-600 CPU and running Windows 98, this Dimension earns a hearty PC WorldBench 2000 score of 136—on a par with some PIII-733s we've tested. Four open slots (three PCI and one ISA) and four open bays offer plenty of room for upgrades, despite this midsize tower's smallish interior. You pay a reasonable $1489 and still get Microsoft Office 2000 Small Business Edition as well as Dell's highly rated service and reliability.

WHAT'S NOT: You can type smoothly on the solid Dell QuietKey keyboard, but not as quietly as its name suggests. The Dimension's standard labor warranty lasts for only one year, less than most.

WHAT ELSE: The system ships with thorough documentation, including a setup poster and guide, and a thick reference and troubleshooting manual. The side of the case comes off easily after you loosen a thumbscrew and lift two levers.

BEST USE: The Dimension is a first-rate choice for almost all general business computing needs.

2 MICRO EXPRESS MICROFLEX 850A

WHAT'S HOT: A hefty $150 price cut lifts this Micro Express into Best Buy territory. Packing a speedy Athlon-850 CPU and running Windows 98, the system earned a score of 153 on our PC WorldBench 2000 tests, the second highest on the chart. The easy-open midsize case, secured by one thumbscrew, provides unimpeded access to three open PCI slots and four open bays. Micro Express offers a generous four-year warranty on both parts and labor, more than most vendors.

WHAT'S NOT: Colors on the 17-inch Impression 7VX monitor looked rich, but text appeared slightly blurry at the standard resolution of 1024 by 768. In our

Extra features	Design and expandability [2]	Vendor's system reliability	Tech support quality/ policies	Tech support (hours/days, charge)	Warranty for parts/labor (years)
Very good: NVidia TNT2 M64 graphics card with 32MB of SDRAM, 17X-48X CD-ROM drive, V.90 modem, Microsoft Office 2000 Small Business Edition	**Good:** easy-to-remove side panel; midsize tower; 4 open drive bays, 4 open slots	Outstanding	Good/ Good	24/7, toll-free	3/1
Good: ATI Xpert 2000 Pro graphics card with 32MB of SDRAM and built-in MPEG hardware decoder, 6X DVD-ROM drive, V.90 modem, microphone	**Good:** easily accessible expansion slots; midsize tower; 4 open drive bays, 3 open slots	[3]	Fair [3]/ Outstanding	24/7, toll-free	4/4
Good: Hercules 3D Prophet DDR DVI graphics card with 32MB of DDR SGRAM, 40X-52X CD-ROM drive, V.90 modem, Norton AntiVirus, Corel WordPerfect Office 2000	**Very good:** roomy interior; midsize tower; 4 open drive bays, 3 open slots	[3]	Fair [3]/ Outstanding	24/7, toll-free	3/Lifetime
Good: NVidia GeForce 256 graphics card with 32MB of SDRAM, 12X DVD-ROM drive, V.90 modem, Corel WordPerfect Office 2000	**Very good:** sleep and reset buttons on case; midsize tower; 4 open drive bays, 5 open slots	Fair [3]	Fair [3]/ Good	24/7, toll-free	3/1
Good: NVidia TNT2 M64 graphics card with 16MB of SDRAM, 20X-48X CD-ROM drive, network card, Microsoft Office 2000 SBE, Norton AntiVirus, microphone	**Good:** sturdy case; midsize tower; 5 open drive bays, 3 open slots	Good	Fair/ Outstanding	24/7, toll-free	3/3
Very good: NVidia TNT2 Pro graphics card with 32MB of SDRAM, 12X DVD-ROM drive, network card, Microsoft Office 2000 SBE	**Good:** case lock; midsize tower; 5 open drive bays, 5 open slots	Good	Fair/ Outstanding	24/7, toll-free	Varies [4]/3
Good: NVidia TNT2 M64 graphics card with 32MB of SDRAM, 12X DVD-ROM drive, V.90 modem, Corel WordPerfect Office 2000	**Very good:** multimedia keyboard; minitower; 4 open drive bays, 4 open slots	Fair [3]	Fair [3]/ Good	24/7, toll-free	3/1
Good: NVidia TNT2 M64 graphics card with 16MB of SDRAM, 20X-48X CD-ROM drive, network card, Wake on Lan, Microsoft IntelliMouse	**Good:** chassis intrusion detection, case lock; midsize tower; 3 open drive bays, 3 open slots	Outstanding	Good/ Outstanding	24/7, toll-free	3/3
Good: ATI Rage Fury Pro graphics card with 32MB of SDRAM, 8X DVD-ROM drive, V.90 modem, Corel WordPerfect Office 2000	**Good:** detachable wrist rest, programmable keys; midsize tower; 4 open drive bays, 4 open slots	[3]	Fair [3]/ Good	24/7, toll-free	3/Lifetime
Good: Creative NVidia TNT2 Pro graphics card with 32MB of SDRAM, 8X DVD-ROM drive, 4X/4X/24X CD-RW drive, V.90 modem, Microsoft Office 2000 SBE	**Very good:** sturdy case; midsize tower; 2 open drive bays, 4 open slots	[3]	Good [3]/ Outstanding	24/7, toll-free	5/3
Extra features: 10 percent	Design and expandability: 15 percent	Reliability: 15 percent	Support and warranty: 15 percent		

[3] Insufficient data to give a rating, or the rating is derived from our Reliability and Service survey scores for the vendor's home PCs. For tech support quality, this rating may also depend on our anonymous support-quality calls.

[4] Five years on CPU and main RAM, three years on other parts.

anonymous calls to Micro Express's tech support, we received only Fair service.

WHAT ELSE: Detailed information in a spiral-bound system manual and color-coordinated ports make the MicroFlex easy to set up. Typing on the Microsoft Internet keyboard is smooth and quiet, with plenty of programmable Web buttons to give you quick access to Net and system applications.

BEST USE: The Micro Express MicroFlex 850A provides heady performance at a great price for any small office.

New on the Chart

3 ABS MULTIMEDIA VL

NEW **WHAT'S HOT:** Blazing a trail with a score of 143 on our PC WorldBench 2000 tests, this ABS garnered impressive marks for an Athlon-700 system running Windows 98. The Multimedia VL comes with a handy binder to keep bundled software and documentation in one convenient place. The large system manual contains plenty of helpful color illustrations, and you'll also find documentation for individual components. Thanks in part to a mighty Hercules double data rate graphics board (which also offers S-Video and digital outputs), the 17-inch monitor produced vivid colors in our test images, and text looked sharp at the standard resolution of 1024 by 768.

NUMBER ONE: Dell's Dimension XPS T600r has hearty performance, top service and reliability, and Office 2000.

WHAT'S NOT: You must remove two small, easy-to-lose screws to open the system, and then lift off the entire midsize tower case to access the interior (though it does come off smoothly). A no-frills keyboard permits quiet typing, but it flexes too much for our liking, and the keys feel cramped.

WHAT ELSE: The system's interior offers ample expansion room, with three open PCI slots and four open bays. Our test system included Corel WordPerfect Office 2000, a microphone, and two demonstration games.

BEST USE: The Multimedia VL is the hot pick if you're looking for a maximum of horsepower at a minimum price. ▶

PHOTOGRAPHS: KEN SMITH

9 NUTREND SIERRA LE

NEW **WHAT'S HOT:** Voluminous room to grow characterizes the Sierra LE. Not only does its roomy interior have four open PCI slots and four open bays, but its motherboard supports both Slot 1 and Socket 370 processors, giving you more options if you upgrade the CPU down the road. The ATI Rage Fury Pro graphics board features composite and S-Video output and composite input, a plus if you're interested in video editing or other graphics-intensive work.

IT'S IN THE CARD: The ABS Multimedia VL produces sharp-looking images, thanks in part to a robust Hercules 3D Prophet graphics card with fast DDR (double data rate) memory.

WHAT'S NOT: To gain access to the roomy interior, you need to remove two screws. At 1024 by 768 resolution, the 17-inch Optiquest Q71 displayed rich colors, though not as bright as others we've seen. Tech support in our recent anonymous calls earned only a Fair rating.

WHAT ELSE: With a score of 142 on our PC WorldBench 2000 tests, this system performed slightly above average for PIII-733 systems running Windows 98 SE. The keyboard's keys seemed flimsy, but typing felt smooth and the keyboard has easy-access programmable buttons for common functions, such as volume control. Corel's WordPerfect Office 2000 and Grolier's Multimedia Encyclopedia make up the software bundle. A large binder houses all the documentation and CDs.

BEST USE: With good performance, plenty of expansion options, and an attractive price, the Sierra LE makes a solid general-purpose system that can expand along with your company. It's also suitable for anyone who can do without extensive technical support or hand-holding.

Also of Note

THE REST OF THE new systems we tested this month offer high performance, competitive prices, or fetching features—but not in a winning combination. We like the corporate-level features of the IBM PC 300GL, including a network interface card, case lock, and Wake on LAN—a good mix of components for any business. The system earned a respectable score of 145 on our PC WorldBench 2000 tests, but its $1718 price unfortunately made it less appealing.

Similarly, the IDot.com SA Series 750—powered by an AMD Athlon-750 CPU—offers extra features like a network card and a 10X DVD-ROM drive, and it earned a 140 on our WorldBench tests. But that score matched those of many Athlon-700 and Athlon-650 systems, and the IDot's price of $1766 kept it at bay.

Like the IBM and the IDot.com, the Toshiba Equium 7350D we tested has a price at the upper end of average ($1730) and ships with a heap of corporate-ready features—network interface card, case lock, and LANDesk software. We also liked the system's pop-out motherboard—good at upgrade time. But though the Toshiba may rival the IBM and IDot.com in price and features, it falls well behind in performance. This Equium earned only a 129 on our PC WorldBench 2000 tests—tying for the lowest score among PIII-733 systems running Windows 98.

We also tested two compact desktops with Celeron-533 CPUs. While their prices fall at the lower end of the spectrum, so does their performance. The $1349 Toshiba Equium 7350S earned only a 102 on our PC WorldBench 2000 tests. It comes with a network interface card and LANDesk software for corporate users, but its low score weighed against it.

At $1268, the other compact—the NEC PowerMate ES Slimline—packs just slightly more punch (it scored 106 on PC WorldBench 2000) in an even smaller package. This model offers a front USB port, as well as front headphone and microphone outputs and volume control. With a network interface and chassis intrusion detection, the PowerMate ships ready for corporate offices. But while the model can sit either flat or upright as a minitower, its support legs are flimsy (one broke off when we lifted the case on its side). And neither the NEC nor the Toshiba offers much expansion room—the PowerMate provides three open PCI slots and the Equium only two.

HP's e-Vectra 600 EB almost squeezed onto the chart, but its price and below-average performance kept it off. It also features a compact case, but its lack of open bays and slots won't appeal to companies needing a system that can grow along with their business. ▶

LIMITED APPEAL: The HP e-Vectra 600 EB's compact case looks better than an IPaq, but you can't expand it.

MORE REVIEWS ONLINE

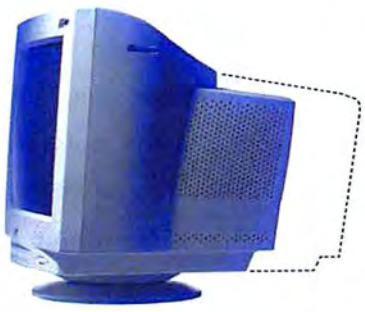
online **WE EVALUATED the following systems along with the others, but they didn't score high enough to make the *Top 10 Midrange PCs* chart. For our capsule write-ups, visit PCWorld.com (www.pcworld.com/t10pcs).**

- **HP e-Vectra 600 EB**
- **IBM PC 300GL**
- **IDot.com SA Series 750**
- **NEC PowerMate ES Slimline**
- **Toshiba Equium 7350D**

www.ctxintl.com

Short-length monitors, that is. Unlike conventional monitors with big butts, the CTX SlimLine Monitors feature slimmer backsides, weigh less, and fit into tight workspaces. And becasue no one knows shortneck technology better than CTX, our SlimLine Series doesn't skimp on ultimate performance and features. Just take a peep at our specs: razor-sharp dot pitch, ultra-high resolution, stringent safety compliance, and Intel® powered USB hub^.

So get to your nearest reseller and get into some CTX short shorts today!



CTX 17" and 19" SlimLine monitors occupy the same space as 14" and 15" conventional CRTs.

VL950SL	VL950ST	VL710S
• 19" / 18" VIS	• 19" / 18" VIS	• 17" / 15.9" VIS
• Short-length CRT	• Short-length CRT	• Short-length CRT
• 0.25 dot pitch	• 0.25 dot pitch	• 0.25 dot pitch
• Flat Square	• Flat Square	• Flat Square
• 1600 X 1200 max. res.	• 1600 X 1200 max. res.	• 1600 X 1200 max. res.
• TCO92	• 4+1 USB power hub on swivel base	• 4+1 USB power hub
	• TCO95	• MPRII

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CTX

PC WORLD

TOP 10 BUDGET PCs

	SYSTEM: UNDER $1200	Month tested	★ Overall rating	Street price (5/15/00)	PC WorldBench 2000 performance score[1] Faster ▶	Base configuration
1	Micro Express MicroFlex 600A 800/989-9900 www.microexpress.net	June 00	89	Average: $1099	Very good 134	**Outstanding:** AMD Athlon-600, 128MB of SDRAM, 512KB L2 cache, 18GB hard drive, 17-inch monitor, Windows 98 SE
2	Axis Systems Terra MX10 800/378-9014 www.axissys.com	July 00	87	Inexpensive: $929	Satisfactory 124	**Very good:** AMD K6-2-550, 128MB of SDRAM, 1MB L2 cache, 15GB hard drive, 17-inch monitor, Windows NT 4.0
3	Sys TaskMaster 600A 800/613-9963 www.sys.com	NEW	84	Expensive: $1199	Very good 135	**Very good:** AMD Athlon-600, 128MB of SDRAM, 512KB L2 cache, 13.6GB hard drive, 17-inch monitor, Windows 98 SE
4	Quantex SB500sx 800/352-4051 www.quantex.com	May 00	84	Inexpensive: $829	Satisfactory 101	**Good:** Celeron-500, 64MB of SDRAM, 128KB L2 cache, 15GB hard drive, 17-inch monitor, Windows 98 SE
5	IDot.com SA Series 600 888/388-4368 www.idot.com	July 00	83	Expensive: $1169	Very good 125	**Good:** AMD Athlon-600, 64MB of SDRAM, 512KB L2 cache, 13.5GB hard drive, 17-inch monitor, Windows 98 SE
6	Quantex M650sx 800/352-4051 www.quantex.com	June 00	82	Average: $1029	Good 121	**Good:** Pentium III-650, 64MB of SDRAM, 256KB L2 cache, 15GB hard drive, 17-inch monitor, Windows 98 SE
7	NuTrend Athlon Force 2 888/482-6678 www.nutrend.com	June 00	81	Expensive: $1149	Very good 133	**Very good:** AMD Athlon-650, 128MB of SDRAM, 512KB L2 cache, 15GB hard drive, 17-inch monitor, Windows 98 SE
8	Racer PC500c 800/843-8458 www.racerpc.com	Feb 00	80	Inexpensive: $799	Satisfactory 102	**Good:** Celeron-500, 64MB of SDRAM, 128KB L2 cache, 8.4GB hard drive, 17-inch monitor, Windows 98 SE
9	Acer Power 4400 800/733-2237 www.acer.com	May 00	79	Expensive: $1199	Good 118	**Good:** Pentium III-600, 64MB of SDRAM, 512KB L2 cache, 13GB hard drive, 17-inch monitor, Windows 98 SE
10	Micron ClientPro Cf 800/642-7667 www.micronpc.com	NEW	78	Expensive: $1197	Good 115	**Very good:** Celeron-433, 128MB of SDRAM, 128KB L2 cache, 4.3GB hard drive, 17-inch monitor, Windows 2000 Pro
	Best Buy	Percent of overall rating ▶		Price: 22 percent	Performance: 13 percent	Base configuration: 10 percent

[1] A system's performance word score is relative to the scores earned by other PCs running the same operating system. For more details, see "Your Guide to the Top 100" on page 183.

[2] We define vertical cases as towers (taller than 20 inches), midsize towers (15.5 to 20 inches), or minitowers (shorter than 15.5 inches); and horizontal cases as desktops (5 inches or taller) or compacts (shorter than 5 inches).

OF THE 17 NEW SYSTEMS we tested this month, only two join the budget elite. Though pricey, Sys Technology's new TaskMaster 600A offers solid performance and five open drive bays, no less. Micron's diminutive ClientPro Cf, on the other hand, has no open bays or slots, but it squeaks onto the chart on the strength of its high-end corporate features. For the third month in a row, Micro Express's MicroFlex 600A retains its top-of-the-chart position.

1 MICRO EXPRESS MICROFLEX 600A

WHAT'S HOT: Its Athlon-600 processor propelled the MicroFlex 600A to a noteworthy score of 134 on our PC WorldBench 2000 tests, just shy of the new Sys Technology TaskMaster 600A's score of 135. For those overstressed wrists, the Microsoft Natural Keyboard may return you to comfortable, quiet typing. The uncluttered interior of the midsize tower holds three open PCI slots and four open bays for lots of expansion. The MicroFlex also has the largest hard drive on the chart, a generous 18GB.

WHAT'S NOT: This well-rounded system is hard to knock, though business users might wish for a network card instead of a modem for connectivity.

WHAT ELSE: A well-organized system manual provides lots of information, including a detailed glossary, but the blurred images look like photocopies. Colors on the 17-inch Impression 7VX monitor appeared deep and rich, and text remains crisp except at the highest resolution of 1600 by 1200. The ATI Rage Fury graphics card offers S-Video and composite output—boons for presenters. The 6X DVD-ROM drive is a pleasant surprise at this unit's bargain price.

BEST USE: This is an excellent general-use system for a small office seeking performance on a shoestring.

2 AXIS SYSTEMS TERRA MX10

WHAT'S HOT: For $929, the Terra MX10 won't put much of a hole in your pocket. A detailed system manual includes helpful troubleshooting and upgrading information, as well as thorough documentation for the system's components. The 17-inch Axis 700EX monitor produces rich colors and crisp text, with only slight blurring at its maximum resolution of 1280 by 1024. The midsize tower's fairly neat interior serves

Extra features	Design and expandability [2]	Vendor's system reliability	Tech support quality/ policies	Tech support (hours/days, charge)	Warranty for parts/labor (years)
Good: ATI Rage Fury graphics card with 32MB of SDRAM, 6X DVD-ROM drive, V.90 modem, hardware MPEG, Norton AntiVirus, Microsoft Natural Keyboard	**Very good:** easy motherboard access; midsize tower; 4 open drive bays, 3 open slots	[1]	Fair [1]/ Outstanding	24/7, toll-free	4/4
Good: Creative Labs NVidia TNT2 Pro graphics card with 32MB of SGRAM, 40X-52X CD-ROM drive, V.90 modem, Microsoft IntelliMouse	**Very good:** easy-to-remove case; midsize tower; 4 open drive bays, 4 open slots	[1]	Good [1]/ Outstanding	24/7, toll-free	5/3
Good: Matrox Millennium G400 graphics card with 16MB of SGRAM, 17X-40X CD-ROM drive, V.90 modem, network card, case lock, Corel WordPerfect Suite 8	**Good:** easy-open case, spacious interior; midsize tower; 5 open drive bays, 3 open slots	[1]	Good [1]/ Good	24/7, toll-free	Varies [4]/5
Good: integrated Intel 810 graphics with UMA, 24X-48X CD-ROM drive, V.90 modem, network card, Corel WordPerfect Office 2000	**Good:** removing side panel takes fiddling; midsize tower; 4 open drive bays, 1 open slot	Fair [3]	Fair [1]/ Good	24/7, toll-free	3/1
Good: NVidia TNT2 graphics card with 16MB of SDRAM, 17X-48X CD-ROM drive, network card, McAfee VirusScan, microphone	**Good:** cramped interior; midsize tower; 3 open drive bays, 4 open slots	[1]	Good [1]/ Good	24/7, toll-free	2/2
Good: integrated Intel 810 graphics with UMA, 12X DVD-ROM drive, V.90 modem, Corel WordPerfect Office 2000	**Good:** programmable keyboard buttons; midsize tower; 4 open drive bays, 2 open slots	Fair [3]	Fair [1]/ Good	24/7, toll-free	3/1
Good: ATI Rage 128 graphics card with 16MB of SDRAM, 8X DVD-ROM drive, V.90 modem, Corel WordPerfect Office 2000	**Good:** neat interior; midsize tower; 4 open drive bays, 4 open slots	[1]	Fair [1]/ Good	24/7, toll-free	3/Lifetime
Satisfactory: integrated Intel 810 graphics with UMA, 4.8X DVD-ROM drive, V.90 modem	**Good:** side handles on case; minitower; 1 open drive bay, 3 open slots	[1]	Good [1]/ Good	24/7, toll-free	Varies [5]/3
Good: Acer NVidia TNT2 graphics card with 16MB of SDRAM, 12X-40X CD-ROM drive, network card, chassis intrusion detection, case lock, LANDesk Client Manager, Wake on LAN	**Good:** RAM slots hard to access; desktop; 3 open drive bays, 2 open slots	Poor [3]	Fair [1]/ Good	24/7, toll-free	3/3
Good: integrated Intel 810 graphics with UMA, 24X-40X CD-ROM drive, network card, LANDesk Client Manager, Norton AntiVirus	**Limited:** 2 front-mounted USB ports; compact desktop; no open drive bays, no open slots	Good	Fair/ Outstanding	24/7, toll-free	Varies [6]/3
Extra features: 10 percent	Design and expandability: 15 percent	Reliability: 15 percent	Support and warranty: 15 percent		

[3] Insufficient data to give a rating, or the rating is derived from the vendor's Reliability and Service survey scores for its home PCs. For tech support quality, this rating may also depend on our anonymous support-quality calls.

[4] Six years on CPU and main RAM; three years on other parts.

[5] One year on screen, mouse, and keyboard; three years on other parts.

[6] Five years on CPU and main SDRAM; three years on other parts.

up substantial room for expansion: four open slots (three PCI and one ISA) and four open bays (one internal and three at the front of the case). However, the placement of the CPU makes the internal bay somewhat hard to reach.

WHAT'S NOT: Based on an AMD K6-2-550 CPU, this system earned a score of 124 on our PC WorldBench 2000 tests. Although that's not bad for a budget system, it is the lowest posted by any Windows NT system we've tested (including a Celeron-500 machine with only 64MB of RAM).

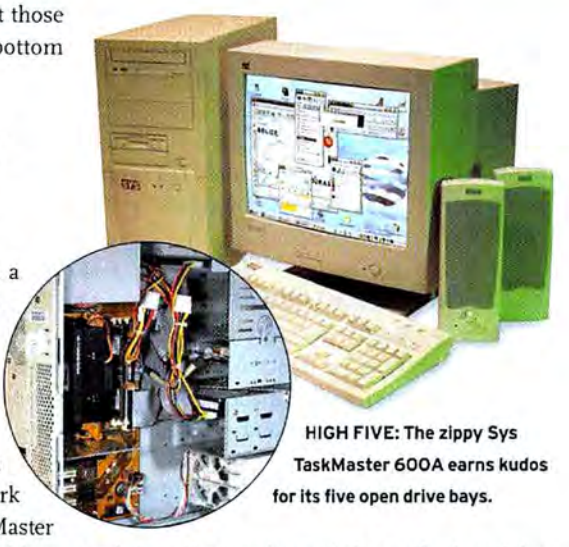
WHAT ELSE: To get inside the midsize case, you must remove four screws that are easily lost, and reattaching the case takes some wiggling. The generic keyboard includes a detachable wrist rest, but getting the keys to register requires firm pressure. Well-labeled rear ports help make setup easier for novices.

BEST USE: It's not the fasted we've tested, but with its competitive, sub-$1000 price, the Terra MX10 should suit those more concerned with the bottom line than with horsepower.

New on the Chart

3 SYS TECHNOLOGY TASKMASTER 600A

NEW **WHAT'S HOT:** With a 135 score on our PC WorldBench 2000 tests, this Athlon-600–powered Sys PC scored 4 points higher than the average for similarly equipped machines. With both a modem and a network interface installed, the TaskMaster 600A is ready for high- and low-speed connections to the Internet. An uncluttered interior offers three open PCI slots and five open bays for expansion.



HIGH FIVE: The zippy Sys TaskMaster 600A earns kudos for its five open drive bays.

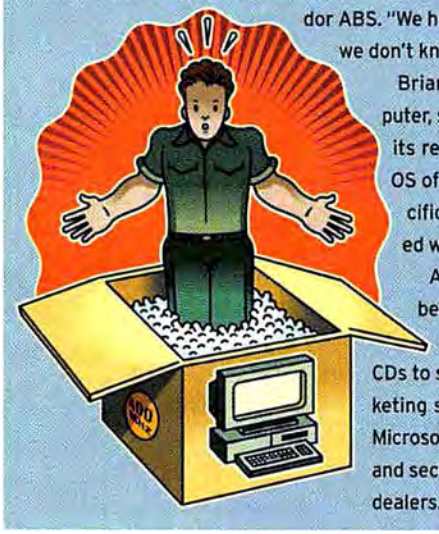
WHAT'S NOT: Sys Technology provides user manuals for some components, such as the monitor and the motherboard, but it lacks an overall user guide to aid with problems and simplify troubleshooting.

WHAT ELSE: You have to remove two screws to access the system's interior; the solid side panel slides off and back on ▶

PHOTOGRAPHS: KEN SMITH

Microsoft Plays Hardball With Your Software

TECH TREND WHEN YOU BUY A PC bundled with an operating system, you expect the package to include the full OS software on CD in case you need to do a full restore. Right? Wrong. Microsoft has implemented a "medialess" policy requesting (read: demanding) that vendors ship systems with only a recovery CD or a backup disk image that may lack certain drivers or utilities of the full OS. The excuse? A tactic to combat piracy.



"We're not sure what it'll mean yet," says Ken Lam, vice president of marketing at PC vendor ABS. "We haven't seen a prototype of the recovery CD, so we don't know how much less consumers will be getting." Brian Zucker, technology evangelist at Dell Computer, says the company will include the entire OS on its recovery CD, but you won't be able to pass the OS off to friends. "It uses a protection scheme specific to Dell machines," he says. Dell hasn't decided whether its CD will be tied to particular models.

ABS's Lam feels that Microsoft has a legitimate beef about piracy—not on the consumer level, but from major vendors illegally selling the OS CDs to smaller vendors. "It helps prevent a gray-marketing situation. Big vendors with a direct license to Microsoft have lower costs for the CDs, and some first- and second-tier vendors sell the OS to smaller system dealers. Microsoft doesn't like that," he says.

smoothly thanks to well-designed guide rails. At the standard 1024 by 768 resolution, colors on the 17-inch Optiquest Q71 monitor looked a tad light. Text appeared crisp, though. Typing on the keyboard proved smooth and quiet, while Sleep, Wake Up, and Power buttons on the keyboard provide fast access to common system controls. Other extras include a case lock and Corel's WordPerfect Suite 8.

BEST USE: Ample upgrade room and fast performance make this system a good choice for small and home offices.

10 MICRON CLIENTPRO CF

NEW **WHAT'S HOT:** The ClientPro Cf has a compact case, yet it includes a network interface card, remote management software, and two front-mounted USB ports (besides the two at the rear), plus Windows 2000 Professional Edition.

WHAT'S NOT: Except for two open memory sockets (partially blocked), the PC offers no expansion room. All the drive bays and expansion slots in our test unit were occupied. A low-end Celeron-433 powers the system, and our review unit came with a stingy 4.3GB hard drive (be sure to ask for a larger drive when you order—the case can hold only one). The 24X–40X CD-ROM drive is acceptable for this price. The PC offers the LANDesk system management tool, but if you use this feature, you're likely to take a modest hit in system performance.

WHAT ELSE: The Micron ClientPro Cf earned a 115 on our PC WorldBench 2000 tests, about average for similarly equipped systems running Windows 2000; however, we don't see many new machines with a Celeron-433 CPU these days, so it's hard to make exact comparisons. The system's 17-inch Micron 700DX monitor rendered deep colors, although text looked a bit fuzzy at 1024 by 768 resolution and higher. The user manual has helpful troubleshooting information, but documentation for individual components is lacking.

BEST USE: Micron's ClientPro Cf reflects an emerging trend toward small, relatively inexpensive corporate PCs.

Also of Note

A FEW SYSTEMS didn't make the cut this month. The Micro Express MicroFlex-6A has a host of features often missing in the budget systems. A Microsoft Natural Keyboard permits smooth, quiet, comfortable typing, while an ATI Rage 128 Pro graphics board offers both S-Video and composite output as well as composite input for video editing. In addition, the MicroFlex sports an 8X DVD-ROM drive, and earned a 132 score on our PC WorldBench 2000 tests—near the high end of the range for PIII-600B–equipped systems. The hard disk made grinding noises when working, and the 17-inch Impression 7V monitor displayed blurry text.

With an excellent business bundle that includes Microsoft Office 2000 SBE, the Dell Dimension L500cx might have made our chart. But a pared-down configuration and subpar performance on our PC WorldBench 2000 tests held it back—its score of 97 ties for the lowest we've seen from a Celeron-500. The system offers easy service and upgrades, thanks to a case that opens without tools, and slide-out drive bays. Documentation includes excellent setup guides and a large reference and troubleshooting manual. ▶

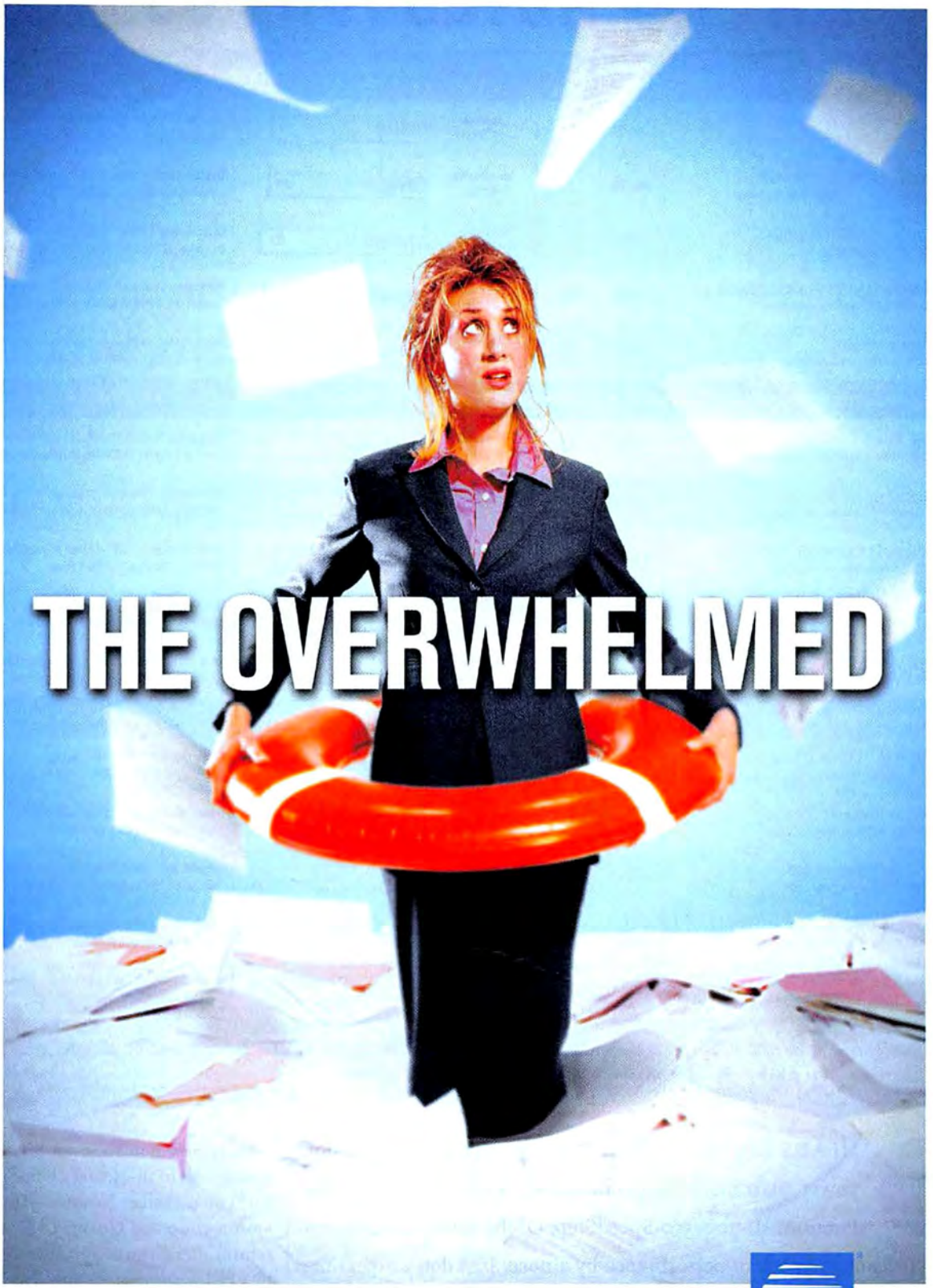
LOADED COMPACT: The Micron ClientPro Cf's high-end business features help it secure a spot on the chart.

ILLUSTRATION: PETER HOEY

MORE REVIEWS ONLINE

online THE FOLLOWING SYSTEMS didn't score high enough to reach the *Top 10 Budget PCs* chart. For write-ups, visit PCWorld.com (www.pcworld.com/t10pcs).

- Dell Dimension L500cx
- Micro Express MicroFlex-6A



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PC WORLD

TOP 15 NOTEBOOK PCs

	POWER NOTEBOOK: $2700 AND OVER	Month tested	★ Overall rating	Street price (5/12/00)	PC WorldBench 2000 performance score (Faster ▶)	Base configuration
1	Gateway Solo 9300LS 800/846-2000 www.gateway.com	June 00	90	Average: $2973	Good 119	**Very good:** Pentium III-650/500, 15-inch active screen, touchpad, 64MB of SDRAM, 6GB hard drive
2	IBM ThinkPad i Series 1492 800/426-7255 www.ibm.com/pc/us/thinkpad	July 00	90	Inexpensive: $2788	Good 120	**Outstanding:** Pentium III-500, 15-inch active screen, eraserhead, 128MB of SDRAM, 12GB hard drive
3	Dell Inspiron 5000 G700VT 800/388-8542 www.dell.com	NEW	90	Expensive: $3287	Very good 127	**Outstanding:** Pentium III-700/550, 15-inch active screen, touchpad, 128MB of SDRAM, 18GB hard drive
4	Toshiba Satellite Pro 4300 Series 800/867-4422 www.buy.toshiba.com	NEW	88	Inexpensive: $2899	Very good 125	**Very good:** Pentium III-700/550, 15-inch active screen, eraserhead, 64MB of SDRAM, 12GB hard drive
5	Quantex W-1511 800/896-4898 www.quantex.com	NEW	87	Average: $2599	Outstanding 133	**Outstanding:** Pentium III-700/550, 15-inch active screen, touchpad, 128MB of SDRAM, 18GB hard drive
	MIDRANGE NOTEBOOK: $2000 TO $2699	**Percent of overall rating ▶**		**Price: 14 percent**	**Performance: 20 percent**	**Base configuration: 5 percent**
1	Axis Systems Fusion 7280V 800/378-9014 www.axissys.com	NEW	78	Average: $2399	Outstanding 137	**Very good:** Pentium III-500, 14.1-inch active screen, touchpad, 256MB of SDRAM, 12GB hard drive
2	Micro Express NP4600A 800/989-9900 www.microexpress.net	NEW	77	Inexpensive: $2099	Good 111	**Outstanding:** Pentium III-600/500, 15.1-inch active screen, touchpad, 128MB of SDRAM, 12GB hard drive
3	Chem USA ChemBook 3015 800/866-2436 www.chemusa.com	May 00	76	Inexpensive: $2099	Good 114	**Good:** Pentium III-500, 14.1-inch active screen, touchpad, 128MB of SDRAM, 6.5GB hard drive
4	Enpower ENP-314@P3 800/997-2258 www.enpower.com	June 00	76	Inexpensive: $2149	Very good 121	**Very good:** Pentium III-550, 14.1-inch active screen, touchpad, 128MB of SDRAM, 6GB hard drive
5	NEC Versa VX 888/632-8701 www.nec-computers.com	May 00	75	Average: $2399	Good 104	**Very good:** Pentium III-500, 14.1-inch active screen, touchpad, 64MB of SDRAM, 12GB hard drive
	BUDGET NOTEBOOK: UNDER $2000	**Percent of overall rating ▶**		**Price: 17 percent**	**Performance: 17 percent**	**Base configuration: 5 percent**
1	Dell Inspiron 3800 C500 GW 800/388-8542 www.dell.com	June 00	85	Expensive: $1867	Very good 101	**Good:** Celeron-500, 14.1-inch active screen, touchpad, eraserhead, 64MB of SDRAM, 6GB hard drive
2	Micron Transport LT C500 800/642-7667 www.micronpc.com	June 00	82	Expensive: $1999	Very good 99	**Good:** Celeron-500, 12.1-inch active screen, touchpad, 64MB of SDRAM, 6GB hard drive
3	Compaq Notebook 100 800/345-1518 www.compaq.com	June 00	80	Average: $1499	Good 85	**Satisfactory:** AMD K6-2-475, 12.1-inch active screen, touchpad, 64MB of SDRAM, 5GB hard drive
4	Compaq Armada V300 800/345-1518 www.compaq.com	NEW	79	Expensive: $1799	Satisfactory 80	**Good:** Celeron-466, 12.1-inch active screen, touchpad, 64MB of SDRAM, 6GB hard drive
5	Axis Systems Fusion 7260A 800/378-9014 www.axissys.com	July 00	78	Average: $1699	Very good 99	**Good:** Celeron-533, 14.1-inch active screen, touchpad, 64MB of SDRAM, 6.4GB hard drive
	Best Buy	**Percent of overall rating ▶**		**Price: 20 percent**	**Performance: 14 percent**	**Base configuration: 5 percent**

[1] All notebooks here come with a lithium ion battery.

[2] Includes computer; adapter; power cord; and floppy, DVD-ROM, or CD-ROM drive.

[3] Insufficient data to give a rating.

[4] Due to insufficient data from survey, score is based on responses to anonymous calls for tech support.

HEADS UP, SPEED JUNKIES: Three newcomers on the power chart mark the debut of Intel's latest processor, the Pentium III-700/550 SpeedStep. Of the three, the Quantex W-1511 leads the pack in performance by a nose. Just don't expect the moon from the new SpeedStep—it provides a relatively small boost for the megahertz. On average, the PIII-700 notebooks we've seen are only about 3 percent faster than a similarly configured PIII-650 model.

Every new notebook we tested this month—six in all—found a home on our list. Two past chart favorites—Dell's Inspiron 5000 and Quantex's W-1511—return, after a two-month absence, with new PIII-700/550 processors. The W-1511 beats its near-twin in both performance and price, but system reliability and vendor support weigh heavily in our calculations: Dell's longer warranty and Good

Extra features [1]	Design and ease of use	Battery life (hours:min)	Travel weight (pounds) [2]	Vendor's system reliability	Tech support quality/ policies	Tech support (hours/days, charge)	Warranty for parts/labor (years)
Excellent: 10X-24X CD-ROM drive, V.90 modem, LS-120 drive, Microsoft Office 2000 SBE	**Excellent:** two modular bays offer configuration options; TV-out port and Dolby jack	**Outstanding:** 4:46	**Heavy:** 8.6	**Good**	**Fair/Good**	24/7, toll-free	3/3
Good: 6X DVD-ROM drive, V.90 modem, Lotus SmartSuite	**Very good:** LED illuminates keyboard for typing in the dark; colorful $29 screen covers	**Very good:** 4:00	**Average:** 8.4	**Good**	**Good/Fair**	24/7, toll-free	1/1
Good: 8X DVD-ROM drive, V.90 modem, single multipurpose bay, Microsoft Works Suite 2000	**Very good:** decked-out business machine offers great display	**Good:** 3:15	**Heavy:** 8.8	**Good**	**Good/Best**	24/7, toll-free	3/3
Satisfactory: 6X DVD-ROM drive, V.90 modem	**Average:** all-in-one features utility that can turn the keyboard into a collection of shortcuts	**Satisfactory:** 2:38	**Average:** 8.3	**Good**	**Fair/Good**	24/7, toll-free	1/1
Good: 6X DVD-ROM drive, V.90 modem, multipurpose bay takes second lithium ion battery	**Very good:** top-of-the-line SpeedStep has TV-out port; screen overhang could pose a problem	**Good:** 3:20	**Heavy:** 8.7	[3]	**Fair [4]/Fair**	24/7, toll-free	Varies [5]/1
Extra features: 5 percent	**Design and ease of use: 10 percent**	**Battery life: 8 percent**	**Weight: 8 percent**	**Reliability: 20 percent**	**Support and warranty: 10 percent**		
Good: 4X DVD-ROM drive, V.90 modem	**Average:** two-tone all-in-one boasts handy external battery gauge and volume thumbwheel	**Good:** 3:20	**Average:** 8.2	[3]	**Fair [4]/Fair**	24/7, toll-free	3/3
Good: 6X DVD-ROM drive, V.90 modem	**Average:** built-in network jack, two USB ports; only one PC Card slot; no docking connection	**Satisfactory:** 2:45	**Average:** 8.2	[3]	**Fair [4]/Fair**	24/7, toll-free	2/2
Good: 12X-24X CD-ROM drive, V.90 modem, single multipurpose bay	**Very good:** unpretentious all-black portable holds two batteries at once	**Good:** 3:20	**Average:** 7.6	[3]	**Fair [4]/Fair**	9/5, toll-free	1/3
Good: 8X DVD-ROM drive, V.90 modem	**Average:** external charge indicator lets you check battery life; no audio niceties	**Satisfactory:** 2:57	**Average:** 8.2	[3]	**Fair [4]/Fair**	11/5, toll-free	1/1
Satisfactory: 12X-24X CD-ROM drive, V.90 modem	**Average:** half-executed CD controls and launch buttons hurt design	**Satisfactory:** 2:55	**Average:** 7.3	**Fair**	**Good [4]/Best**	24/7, toll-free	1/1
Extra features: 5 percent	**Design and ease of use: 10 percent**	**Battery life: 8 percent**	**Weight: 8 percent**	**Reliability: 20 percent**	**Support and warranty: 10 percent**		
Good: 10X-24X CD-ROM drive, V.90 modem, single multipurpose bay, Microsoft Works 2000	**Excellent:** thinnish, versatile business laptop comes in different colors; easily upgradable	**Poor:** 1:58	**Average:** 7.8	**Good**	**Good/Good**	24/7, toll-free	1/1
Very good: 10X-24X CD-ROM drive, V.90 modem, single multipurpose bay, Microsoft Office 2000 SBE	**Average:** lightweight travel laptop can use $20 USB floppy drive; mouse buttons programmable	**Satisfactory:** 2:32	**Light:** 6.7	**Good**	**Good [4]/Fair**	24/7, toll-free	Varies [6]/1
Limited: 12X-24X CD-ROM drive, V.90 modem, Microsoft Word 2000	**Limited:** no standard docking station port, but vendor sells USB legacy hub	**Satisfactory:** 2:36	**Average:** 7.4	**Fair**	**Fair/Fair**	24/7, toll-free	1/1
Good: 10X-24X CD-ROM drive, V.90 modem, single multipurpose bay	**Very good:** modular bay holds six different devices; all-in-one's screen too small for price	**Satisfactory:** 2:46	**Average:** 7.1	**Fair**	**Fair/Fair**	24/7, toll-free	1/1
Limited: 10X-24X CD-ROM drive	**Average:** all-in-one portable has handy external battery gauge	**Satisfactory:** 2:06	**Average:** 8.1	[3]	**Fair [4]/Fair**	24/7, toll-free	3/3
Extra features: 5 percent	**Design and ease of use: 10 percent**	**Battery life: 8 percent**	**Weight: 8 percent**	**Reliability: 20 percent**	**Support and warranty: 10 percent**		

[5] Three years on CPU and main memory, one year on other parts.

[6] Five years on CPU and main memory, one year on other parts.

reliability rating lift the Inspiron above the Quantex on the power list.

A newcomer from Axis Systems, the Fusion 7280V, captures first place on the midrange chart with outstanding performance on PC WorldBench 2000. This laptop carries 256MB of RAM—more than twice the amount most notebooks have—which helps explain why this PIII-500 system performs better than PIII-500 units with only 128MB of RAM.

Contributing Editor Carla Thornton regularly covers notebooks for PC World.

FULL REVIEWS ONLINE

online

FOR DETAILED WRITE-UPS of all the new notebooks that were tested this month, visit PC World.com (www.pcworld.com/top400).

WELL-LIT: Axis Systems' Fusion 7280V has an external battery gauge.

PHOTOGRAPH: KEN SMITH

PC WORLD

TOP 15 HOME PCs

	POWER SYSTEM: $2000 AND OVER	Month tested	★ Overall rating	Street price (5/15/00)	PC WorldBench 2000 performance score [1] (Faster ▶)	Base configuration [2]
1	Dell Dimension XPS B866r 800/388-8542 www.dell.com	NEW	94	Very expensive: $2879	Outstanding 158	**Very good:** Pentium III-866, 128MB of RDRAM, 256KB L2 cache, 30GB hard drive, midsize tower, 19-inch monitor, Windows 98 SE
2	Gateway Select 850 800/315-2536 www.gateway.com	June 00	89	Very inexpensive: $2099	Outstanding 150	**Very good:** AMD Athlon-850, 128MB of SDRAM, 512KB L2 cache, 27.3GB hard drive, midsize tower, 19-inch monitor, Windows 98 SE
3	Micron Millennia Max 733 800/642-7667 www.micronpc.com	July 00	88	Inexpensive: $2199	Outstanding 150	**Very good:** Pentium III-733, 128MB of SDRAM, 256KB L2 cache, 20.5GB hard drive, midsize tower, 19-inch monitor, Windows 98 SE
4	Quantex GX800SX 800/352-4051 www.quantex.com	June 00	85	Average: $2299	Very good 147	**Very good:** Pentium III-800EB, 128MB of SDRAM, 256KB L2 cache, 30.7GB hard drive, midsize tower, 19-inch monitor, Windows 98 SE
5	HP Pavilion 9690c PC 800/752-0900 www.hp-at-home.com	May 00	82	Expensive: $2798	Very good 147	**Good:** Pentium III-800EB, 128MB of SDRAM, 256KB L2 cache, 40GB hard drive, midsize tower, 17-inch monitor, Windows 98 SE
	MIDRANGE SYSTEM: $1200 TO $1999	Percent of overall rating ▶		Price: 5 percent	Performance: 15 percent	Base configuration: 10 percent
1	Dell Dimension XPS T600r 800/388-8542 www.dell.com	June 00	94	Inexpensive: $1489	Very good 136	**Very good:** Pentium III-600E, 128MB of SDRAM, 256KB L2 cache, 10.2GB hard drive, midsize tower, 19-inch monitor, Windows 98 SE
2	Quantex GX700SX 800/352-4051 www.quantex.com	Mar 00	88	Expensive: $1879	Outstanding 143	**Outstanding:** Pentium III-700, 128MB of SDRAM, 256KB L2 cache, 29GB hard drive, midsize tower, 19-inch monitor, Windows 98 SE
3	Micron Millennia Max 600 800/642-7667 www.micronpc.com	Feb 00	86	Average: $1699	Good 129	**Good:** Pentium III-600, 128MB of RAM, 512KB L2 cache, 20GB hard drive, midsize tower, 17-inch monitor, Windows 98 SE
4	ABS Multimedia System 1 800/876-8088 www.buyabs.com	May 00	84	Expensive: $1849	Outstanding 139	**Outstanding:** AMD Athlon-700, 256MB of SDRAM, 512KB L2 cache, 27GB hard drive, midsize tower, 19-inch monitor, Windows 98 SE
5	Acer Aspire 6422 800/733-2237 www.acer.com	May 00	83	Average: $1599	Very good 136	**Good:** Pentium III-733, 128MB of RAM, 256KB L2 cache, 20GB hard drive, minitower, 17-inch monitor, Windows 98SE
	BUDGET SYSTEM: UNDER $1200	Percent of overall rating ▶		Price: 15 percent	Performance: 10 percent	Base configuration: 10 percent
1	Dell Dimension L500cx 800/388-8542 www.dell.com	NEW	90	Expensive: $1189	Satisfactory 104	**Very good:** Celeron-500, 128MB of RAM, 128KB L2 cache, 10.2GB hard drive, minitower, 17-inch monitor, Windows 98 SE
2	CyberMax ValueMax 700 888/853-2692 www.cybermaxpc.com	July 00	86	Expensive: $1149	Outstanding 140	**Good:** AMD Athlon-700, 128MB of SDRAM, 512KB L2 cache, 15.4GB hard drive, midsize tower, 17-inch monitor, Windows 98 SE
3	Gateway Astro 800/315-2536 www.gateway.com	May 00	85	Very inexpensive: $799	Outstanding 132	**Satisfactory:** Celeron-400, 64MB of SDRAM, 128KB L2 cache, 4.3GB hard drive, all-in-one, 15-inch monitor, Windows 98 SE
4	Quantex M650SX 800/352-4051 www.quantex.com	May 00	84	Average: $1099	Satisfactory 92	**Good:** Pentium III-650, 128MB of SDRAM, 256KB L2 cache, 20.5GB hard drive, minitower, 17-inch monitor, Windows 98 SE
5	CyberMax Enthusiast 500 CBG 888/853-2692 www.cybermaxpc.com	May 00	83	Average: $949	Good 107	**Very good:** Celeron-500, 128MB of SDRAM, 128KB L2 cache, 13GB hard drive, midsize tower, 17-inch monitor, Windows 98 SE
	Best Buy	Percent of overall rating ▶		Price: 20 percent	Performance: 10 percent	Base configuration: 5 percent

[1] A system's performance word score is relative to the scores earned by other PCs running the same operating system. For more details, see "Your Guide to the Top 100" on page 183.

DELL DOMINATES THE CHART this month, thanks to quick performance, easy setup, and great reliability and service. Dell's new Dimension XPS B866r and Dimension L500cx cap the power and budget charts, respectively, while the holdover Dimension XPS T600r continues to rule the midrange chart. Neither newcomer could be called bargain priced, however—particularly the B866r, which lands just south of $3000. New systems that missed the chart include Axis Systems' $1599 Terra AXB, an inexpensive PC that lacks support for beginners, and Polywell's $2650 Poly 800K-7 900 AMD, which performed very well on our tests and produced fast, smooth game play but doesn't offer enhancements we would expect at its price.

The CyberMax ValueMax 700 gets a new $1149 price, qualifying it for the budget chart. This fast performer is now a

Extra features	Setup/ ease of use	Graphics	Reliability/ support	Comments
Very good: NVidia GeForce 256 DDR graphics board with 64MB of DDR SDRAM, 12X DVD-ROM, V.90 modem	Outstanding/ Good	Very good	Outstanding/ Good	**PRO:** Fastest PC on the chart, good graphics. **CON:** Most expensive PC here.
Good: Creative Labs 3D Blaster Annihilator graphics board with 32MB of SDRAM, 10X DVD-ROM drive, V.90 modem	Outstanding/ Very good	Very good	Fair/Fair	**PRO:** Fast and highly expandable, $330 price drop, least expensive power PC on chart. **CON:** Short on extra features.
Very good: NVidia NV990 graphics board with 32MB of DDR SGRAM, 12X DVD-ROM drive, 8X/4X/24X CD-RW drive, V.90 modem	Outstanding/ Good	Very good	Good/Fair	**PRO:** Good graphics quality, inexpensive. **CON:** DVD movies are too dark, and player lacks brightness settings.
Very good: Guillemot 3D Prophet graphics board with 32MB of SDRAM, 12X DVD-ROM drive, V.90 modem, 4X/2X/24X CD-RW drive	Very good/ Satisfactory	Good	Fair/Fair	**PRO:** Great value, lots of storage and extra features. **CON:** Lackluster DVD movie playback, poorly illustrated setup poster.
Outstanding: Asus AGP V3800 graphics board with 16MB of SDRAM, 8X DVD-ROM drive, V.90/DSL modem, ethernet card, 4X/2X/20X CD-RW drive	Outstanding/ Very good	Good	Fair/Fair	**PRO:** Fast; large hard drive; high-speed Internet connectivity. **CON:** Pricey, limited expansion slots.
Extra features: 15 percent	Setup/ease of use: 5 percent	Graphics: 15 percent	R & S: 35 percent	
Good: ATI Rage 128 Pro graphics board with 16MB of SGRAM, 12X DVD-ROM drive, V.90/DSL modem	Satisfactory/ Good	Good	Outstanding/ Good	**PRO:** Inexpensive, $360 price cut, good performing PC. **CON:** Small hard drive, some blocky images in games.
Good: Creative Labs 3D Blaster Annihilator graphics board with 32MB of SDRAM, 8X DVD-ROM drive, V.90 modem, Iomega Zip 100 drive	Good/ Satisfactory	Good	Fair/Fair	**PRO:** Fastest midrange system, swift 3D-gaming performance. **CON:** Expensive, poorly illustrated setup sheet, inadequately marked ports.
Good: Creative Labs 3D Blaster Annihilator graphics board with 32MB of SDRAM, 12X DVD-ROM drive, V.90 modem	Outstanding/ Good	Good	Good/Fair	**PRO:** Speedy gaming performance, easy-open case. **CON:** Monitor displays fuzzy small text; documentation is too basic.
Very good: Matrox Millennium G400 graphics board with 32MB of SGRAM, 8X DVD-ROM drive, V.90 modem	Good/ Satisfactory	Good	[3]	**PRO:** Zippy performance, dual-display graphics support. **CON:** Pricey for its class, no setup poster, inadequate connector and cable labels.
Good: Acer NVidia RIVA TNT2 graphics board with 16MB of SDRAM, 8X DVD-ROM drive, V.90 modem	Good/ Good	Good	Poor/Fair	**PRO:** Impressive performance for a reasonably priced machine. **CON:** Poor reliability rating.
Extra features: 10 percent	Setup/ease of use: 10 percent	Graphics: 10 percent	R & S: 35 percent	
Good: integrated Intel 810 graphics with UMA, 22X-48X CD-ROM drive, V.90 modem	Outstanding/ Good	Satisfactory	Outstanding/ Good	**PRO:** Good monitor, easy setup, top-notch reliability rating. **CON:** Most expensive system on budget chart.
Good: 3dfx Voodoo3 3000 graphics board with 16MB of SDRAM, 12X DVD-ROM drive, V.90 modem	Satisfactory/ Good	Good	Fair/[3]	**PRO:** Highest-performing budget PC. **CON:** Expensive, comes with a mediocre monitor and keyboard.
Satisfactory: integrated Intel 810 graphics with UMA and 4MB of 3D cache, 17X-40X CD-ROM drive, V.90 modem	Outstanding/ Very good	Satisfactory	Fair/Fair	**PRO:** Lowest-priced system on the chart, incredibly easy to set up. **CON:** A tad slow, tiny hard drive.
Good: integrated Intel 810 graphics with UMA and 4MB of 3D cache, 8X DVD-ROM drive, V.90 modem	Good/ Good	Satisfactory	Fair/Fair	**PRO:** Terrific value for a Pentium III-650 processor, roomy interior. **CON:** Small fonts blurry, scant software bundle, rudimentary manual.
Good: integrated Intel 810 graphics with UMA and 4MB of 3D cache, 6X DVD-ROM drive, V.90 modem	Good/ Satisfactory	Satisfactory	Fair/[3]	**PRO:** Speedy budget PC with lots of room for expansion. **CON:** Slow in 3D games, middling sound system.
Extra features: 10 percent	Setup/ease of use: 10 percent	Graphics: 10 percent	R & S: 35 percent	

[2] We define vertical cases as towers (taller than 20 inches), midsize towers (15.5 to 20 inches), or minitowers (shorter than 15.5 inches); and horizontal cases as desktops (5 inches or taller) or compacts (shorter than 5 inches).

[3] Insufficient data to give a rating.

great deal, despite its lackluster monitor. On the midrange chart, the discontinuation of the Micron Millennia Max 533 opens the door for the Acer Aspire 6422 to snag the fifth spot. At $1599, the novice-friendly Aspire 6422 has reasonable performance and clear setup instructions. Though not well equipped for expansion, it makes a good choice for people who want a basic home-office PC that's easy to get up and running.

Kirk Steers is a contributing editor for PC World.

FULL REVIEWS ONLINE

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FOR WRITE-UPS on all the systems we reviewed this month, visit PCWorld.com (www.pcworld.com/top400/newhomepcs).

SMOOTH AND SPEEDY: Dell's blazingly quick Dimension XPS B866r tops the power list.

PHOTOGRAPH: KEN SMITH

Dang. Forgot the racing stripes.

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PC WORLD

TOP 10 PRINTERS

	INK JET PRINTER	Street price (5/15/00)	Overall rating	Speed for plain text/full-page graphics (ppm)	Print quality for text/color graphics	Comments
1	Lexmark Z52 Color Jetprinter (NEW) 800/539-6275 www.lexmark.com	$179	91	5.4/0.6	Very good/ Very good	**FEATURES:** Rated 15 ppm monochrome/7 ppm color. 2400-by-1200-dpi maximum resolution, 100 sheets input, 50 output. **SUMMARY:** The new addition to Lexmark's Z line of ink jets produces sharp text and smooth, realistic images for a reasonable price. It also prints text quickly, though graphics performance is less impressive.
2	HP DeskJet 932C 800/752-0900 www.hp.com	$199	88	3.6/0.7	Good/ Good	**FEATURES:** Rated 4.5 ppm monochrome/2 ppm color. 2400-by-1200-dpi maximum resolution, 100 sheets input, 50 output. **SUMMARY:** The DeskJet 932C produces solid text quality, sharp gray-scale images, and detailed, if somewhat light, color graphics. It offers acceptable performance on both text and graphics.
3	Lexmark Z31 Color Jetprinter 800/539-6275 www.lexmark.com	$99	86	2.7/0.3	Good/ Good	**FEATURES:** Rated 8 ppm monochrome/3.5 ppm color. 1200-by-1200-dpi maximum resolution, 100 sheets input, 50 output. **SUMMARY:** A budget-level alternative to the Z52 Color Jetprinter, the Z31 is half as fast on both text output and graphics—but still speedy enough for home use. Its overall image quality is good, though again not as strong as the Z52's.
4	Canon BJC-6000 800/652-2666 www.ccsi.canon.com	$179	86	4.4/1.1	Very good/ Adequate	**FEATURES:** Rated 8 ppm monochrome/5 ppm color. 1440-by-720-dpi maximum resolution, 130 sheets input and output. **SUMMARY:** This reasonably priced ink jet performs well above average among our Top 10 printers. It offers strong text quality and optional networking, but graphics output could be better.
5	Compaq IJ750 800/345-1518 www.compaq.com	$149	84	2.7/0.3	Good/ Good	**FEATURES:** Rated 7 ppm monochrome/3.5 ppm color. 1200-by-1200-dpi maximum resolution, 100 sheets input, 25 output. **SUMMARY:** The inexpensive IJ750 delivers good all-around print quality and reasonable performance on text, but graphics speed ties for slowest on the chart. Images look detailed, but colors can be somewhat off.
6	HP DeskJet 842C (NEW) 800/752-0900 www.hp.com	$149	84	2.6/0.5	Good/ Good	**FEATURES:** Rated 4.6 ppm monochrome/0.5 ppm color. 600-by-1200-dpi maximum resolution, 100 sheets input, 50 output. **SUMMARY:** HP's DeskJet 842C is reasonably priced, but its performance is rather slow. Print quality is generally good, with dark, crisp text; smooth gray-scale images; and detailed, if slightly foggy, color images.
7	HP DeskJet 970Cse 800/752-0900 www.hp.com	$399	80	4.3/0.7	Very good/ Good	**FEATURES:** Rated 6.5 ppm monochrome/5.3 ppm color. 2400-by-1200-dpi maximum resolution, 150 sheets input, 50 output. **SUMMARY:** Speedy small-office printer with built-in duplexer produces good-looking text and clean, straight lines. Colors on graphics appear a bit faded, though output improves dramatically on ink jet paper.
8	Lexmark 3200 Color Jetprinter 800/539-6275 www.lexmark.com	$99	79	2.2/0.4	Good/ Good	**FEATURES:** Rated 6 ppm monochrome/2.5 ppm color. 1200-by-1200-dpi maximum resolution, 100 sheets input, 25 output. **SUMMARY:** Offers solid print quality for a rock-bottom price, but text and graphics speeds are comparatively slow. The 3200 Color Jetprinter could be more sturdily designed, and the unit tends to run noisily.
9	Epson Stylus Color 760 800/463-7766 www.epson.com	$159	79	3.8/1.2	Good/ Adequate	**FEATURES:** Rated 7 ppm monochrome/6 ppm color. 1440-by-720-dpi maximum resolution, 100 sheets input, 30 output. **SUMMARY:** Epson's reasonably priced Stylus Color 760 performs especially well on graphics and about average on text. Color images aren't great, but photographs look fit for framing when printed on glossy paper.
10	Epson Stylus Color 900 800/463-7766 www.epson.com	$299	76	6.8/2.2	Good/ Good	**FEATURES:** Rated 12 ppm monochrome/10 ppm color. 1440-by-720-dpi maximum resolution, 100 sheets input, 30 output. **SUMMARY:** Though blazingly quick at both text and graphics, the Stylus Color 900 is relatively pricey for its features. Highlights include a USB port and an overnight exchange warranty, but graphics output appears a bit dull.

Best Buy Recommended for home Recommended for printing photos For reviews of printers we tested this month, visit www.pcworld.com/t10printers.

TEST PC WORLD CENTER **HOW WE TEST** The overall rating we assign to each ink jet printer is based on a combination of six measures, given the following weightings: print quality (25 percent), price (25 percent), features (15 percent), speed (10 percent), service and support (10 percent), and ease of use (15 percent). For all ratings, higher is better. Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

LEXMARK'S LIVELY NEW Z52 Color Jetprinter supplants the Z51 at the top, earning a Best Buy thanks to its speedy text, strong print quality, and reasonable $179 price. HP's new DeskJet 842C leaps onto the chart at number six. At a low $149, the DeskJet 842C turns in slower speeds than other HP models, but produces good output. Meanwhile, new inexpensive printers from Epson and Canon didn't quite cut the mustard. ▶

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PC WORLD

TOP 10 MONITORS

	19-INCH MONITOR	Month tested	Street price (5/17/00)	Overall rating	Quality of text/graphics	Comments
1	Samsung SyncMaster 950p 800/726-7864 www.samsungmonitor.com	Mar 00	$349	86	Very good/ Very good	**FEATURES:** 17.9-inch viewable area, .26mm dot pitch tube, up to 119-Hz refresh rate,[1] Plug and Play ready,[2] TCO'99 compliant, three-year warranty, 24-hour toll-free support. **SUMMARY:** Superb image quality and a $25 price drop keep this model at the top. Easy-to-use on-screen controls; bulky size may not suit cramped spaces.
2	Cornerstone Technology c901 800/562-2552 www.monitorsdirect.com	May 00	$349	83	Very good/ Good	**FEATURES:** 18-inch viewable area, .26mm dot pitch tube, up to 116-Hz refresh rate,[1] Plug and Play ready,[2] TCO'99 compliant, three-year warranty, 24-hour weekday toll-free support. **SUMMARY:** Holds on to second place, thanks to a low price and sharp text on spreadsheets. Web-page colors not as lively as on other monitors.
3	ViewSonic GS790 800/888-8583 www.viewsonic.com	NEW	$389	82	Good/ Very good	**FEATURES:** 18.1-inch viewable area, .26mm dot pitch tube, up to 118-Hz refresh rate,[1] Plug and Play ready,[2] TCO'99 compliant, three-year warranty, 24-hour daily toll-free support. **SUMMARY:** Vibrant colors in photos and on Web pages make this model a good choice for graphics pros. Around-the-clock tech support also a plus.
4	Dell UltraScan P991 800/388-8542 www.dell.com	Mar 00	$559	82	Excellent/ Very good	**FEATURES:** 17.8-inch viewable area, .24mm–.25mm varying stripe pitch FD Trinitron tube,[3] up to 134-Hz refresh rate,[1] Plug and Play ready, TCO'99 compliant, three-year warranty, 24- hour toll-free support. **SUMMARY:** Priciest model on the chart, but it delivers ultracrisp lettering in word processing documents. Also renders rich graphics.
5	Philips 109B 877/835-1838 www.philipsusa.com	Mar 00	$429	82	Good/ Very good	**FEATURES:** 17.9-inch viewable area, .25mm dot pitch tube, up to 120-Hz refresh rate,[1] Plug and Play ready,[2] TCO'99 compliant, three-year warranty, 16-hour daily toll-free support. **SUMMARY:** Bold graphics, USB port, and short case depth suit graphics users with limited space. Slightly blurry text on spreadsheets. On-screen menu easy to navigate.
6	MGC 997SN 877/428-9642 www.mgcusa.com	NEW	$369	81	Very good/ Very good	**FEATURES:** 18-inch viewable area, .25mm dot pitch tube, up to 120-Hz refresh rate,[1] Plug and Play ready,[2] three-year warranty, 12-hour weekday toll-free support. **SUMMARY:** Sharp text on spreadsheets, lively graphics and competitive price help this model gain a berth. Lacks weekend tech support; TCO'99 compliance optional.
7	LG Studioworks 995E 800/243-0000 www.lgeus.com	Mar 00	$420	81	Very good/ Very good	**FEATURES:** 18-inch viewable area, .26mm dot pitch tube, up to 120-Hz refresh rate,[1] Plug and Play ready,[2] TCO'99 compliant, three-year warranty, 12-hour daily toll-free support. **SUMMARY:** Delivers legible text and clear images. Other models offer more generous support hours. Lacks some advanced on-screen controls.
8	Sampo AlphaScan 812SR 770/449-6220 www.sampotech.com	Mar 00	$369	80	Very good/ Very good	**FEATURES:** 17.5-inch viewable area, .25mm dot pitch tube, up to 130-Hz refresh rate,[1] Plug and Play ready,[2] TCO'95 compliant, three-year warranty, 10-hour weekday toll-free support. **SUMMARY:** Impressive image quality offset by chintzy support hours, but toll-free tech support is now available. Crude icons mar on-screen control menu.
9	Optiquest 095 800/843-6784 www.optiquest.com	NEW	$325	80	Good/ Good	**FEATURES:** 18.2-inch viewable area, .27mm dot pitch tube, up to 107-Hz refresh rate,[1] Plug and Play ready,[2] TCO'99 compliant, three-year warranty, 24-hour daily toll-free support. **SUMMARY:** A bargain price makes this model a good choice for the cost-conscious, but you don't have to pay much more to get better image quality.
10	Mitsubishi Diamond Plus 91 800/843-2515 www.mitsubishi-display.com	May 00	$479	77	Very good/ Good	**FEATURES:** 18.3-inch viewable area, .25mm–.27mm varying stripe pitch Diamondtron NF tube, up to 115-Hz refresh rate,[1] Plug and Play ready,[2] TCO'99 compliant, three-year warranty, 12-hour daily toll-free support. **SUMMARY:** An $80 price drop keeps this model competitive, but it's still a bit costly. Crisp, dense text on word processing documents.

Best Buy For reviews of products that didn't make the chart, visit www.pcworld.com/t10monitors.

TEST PC WORLD TEST CENTER **HOW WE TEST** Ten judges rate a monitor's text and graphics quality. We evaluate each unit on how well it displays typical business letters, a newsletter, spreadsheets, Web pages, and scanned images. The overall rating is based on text and graphics quality (25 percent each), price (25 percent), features and ease of use (20 percent), and service and support (5 percent). The best possible overall rating is 100. Data based on tests designed and conducted by the PC World Test Center. All rights reserved. [1]Highest refresh rate at 1024 by 768 resolution. [2] Plug and Play monitors and graphics cards can communicate bidirectionally. However, Windows 95 does not fully utilize monitor Plug and Play. [3] Uses an aperture grille whose parallel wires near the sides of the screen are strung farther apart than those near the middle.

SIX MODELS ON THE CHART cost under $400, so now is the time to find a bargain 19-incher. Of the three new monitors that debut this month, ViewSonic's GS790 climbs highest, thanks to its bold graphics and reasonable price. MGC's 997SN, at number six, offers impressive image quality, and Optiquest's Q95, number nine, is the cheapest, at $325. Models from ADI, Hitachi, and NEC fell short. Next month, we return to 17-inchers. ▶

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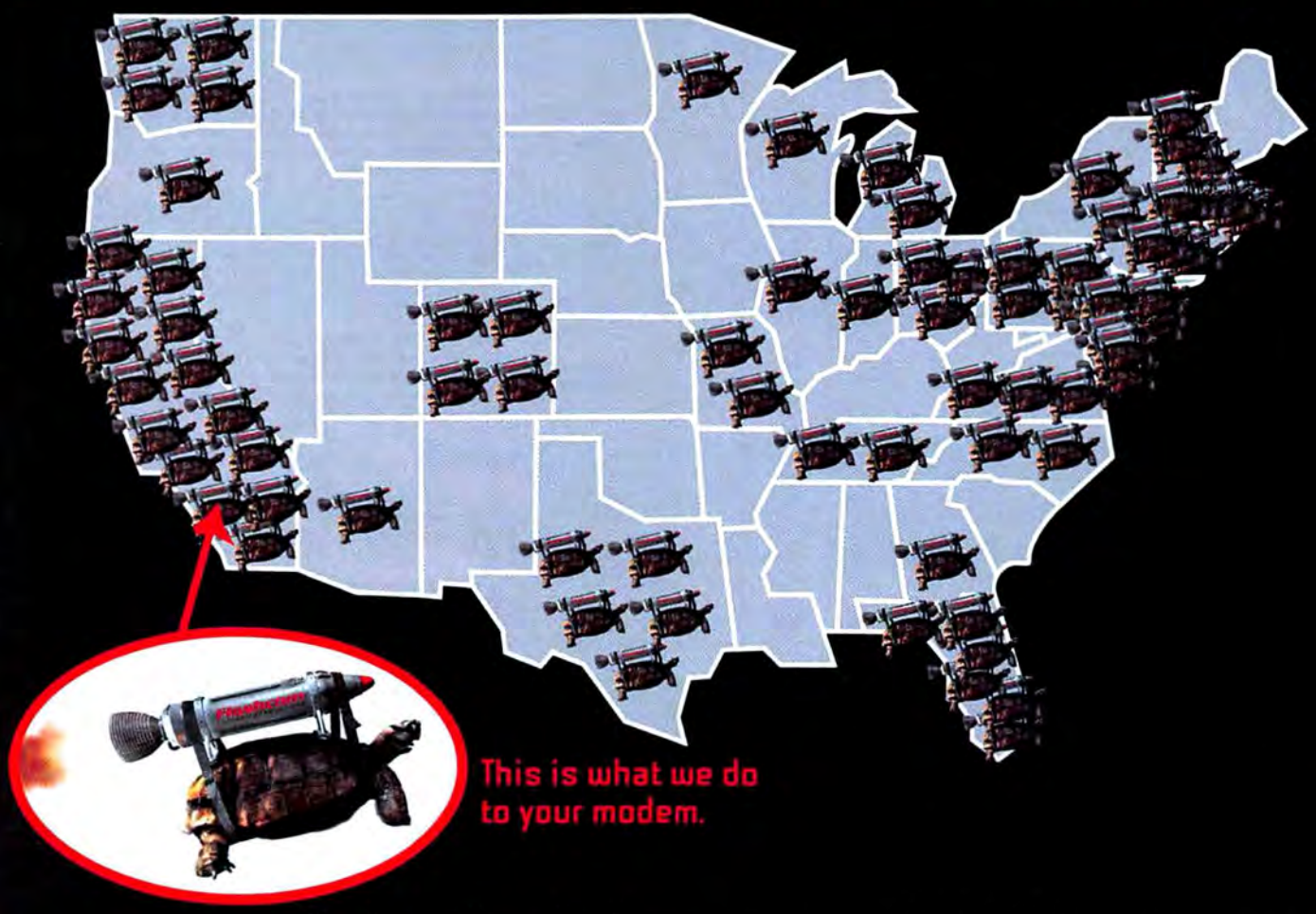

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PC WORLD

TOP 10 GRAPHICS BOARDS

	AGP BOARD	Month tested	Street price (6/5/00)	Overall rating	Mixed-media business rating	3D games rating	Features rating	Comments
1	Matrox Millennium G400 Max 800/361-1408 www.matrox.com/mga	Apr 00	$209	94	Excellent	Very good	Very good	**FEATURES:** 4X AGP, Matrox G400 Max chip, 32MB of SGRAM, 360-MHz RAMDAC, TV-out, two VGA ports, bundled Micrografx Picture Publisher and Simply 3D, plus 3D game–Rage Software's Expendable. **SUMMARY:** Solid speed and dual-display support carry this board to the top.
2	Diamond Viper II 800/468-5846 www.s3.com	June 00	$179	93	Very good	Very good	Good	**FEATURES:** 4X AGP, S3 Savage 2000 chip, 32MB of SDRAM, 350-MHz RAMDAC, TV-out, bundled 3D game–Acclaim's TrickStyle. **SUMMARY:** Renders excellent performance in Unreal Tournament with its latest drivers. For the cost conscious, the $99 Diamond Stealth III S540 Xtreme is also a good value.
3	Cardexpert GeForce 256 DDR 800/539-2273 www.gainward.com	June 00	$230	91	Excellent	Excellent	Good	**FEATURES:** 4X AGP, NVidia GeForce 256 chip, 32MB of DDR SGRAM, 350-MHz RAMDAC, TV-out, bundled 3D games–Psygnosis's Drakan and Rollcage. **SUMMARY:** Speedy gaming board looks good in Unreal Tournament and Quake 3. A $20 price cut keeps it cheaper than most of its DDR competition.
4	Asus AGP-V6600 Deluxe 510/739-3777 www.asus.com	Apr 00	$219	90	Excellent	Very good	Excellent	**FEATURES:** 4X AGP, NVidia GeForce 256 chip, 32MB of SGRAM, 350-MHz RAMDAC, video capture, TV-out, 3D glasses, Ulead Video studio, bundled 3D games–Psygnosis's Drakan and Rollcage. **SUMMARY:** A $30 price drop nudges it up three spots. Pleasing performer loaded with video extras.
5	Leadtek WinFast GeForce 256 DDR 888/532-3835 www.leadtek.com	May 00	$249	90	Excellent	Excellent	Good	**FEATURES:** 4X AGP, NVidia GeForce 256 chip, 32MB of DDR SGRAM, 350-MHz RAMDAC, TV-out, Asymetrix 3D/FX and Digital Video Producer, bundled color-calibration tools. **SUMMARY:** Costs less than most others with DDR memory and renders fine lighting effects in Quake 3.
6	Hercules 3D Prophet DDR-DVI 877/484-5536 www.hercules.com	May 00	$290	89	Excellent	Excellent	Very good	**FEATURES:** 4X AGP, NVidia GeForce 256 chip, 32MB of DDR SGRAM, 350-MHz RAMDAC, DVI port, TV-out, no bundled applications. **SUMMARY:** Swift performer renders lovely images for $30 less than last month. Only card on our chart that features digital output. Non-DDR sibling Hercules 3D Prophet costs $21 less.
7	Hercules 3D Prophet II GTS 877/484-5536 www.hercules.com	NEW	$359	88	Excellent	Excellent	Excellent	**FEATURES:** 4X AGP, NVidia GeForce2 GTS Chip, 32MB of DDR SDRAM, 350-MHz RAMDAC, TV-out, no bundled applications. **SUMMARY:** Sporting the newest NVidia chip set, this card turned in the swiftest 3D performance in the Top 10. It isn't for the cost-conscious, however: It's the priciest card on the chart.
8	ATI Rage Fury Pro 905/882-2600 www.ati.com	Feb 00	$139	87	Good	Good	Very good	**FEATURES:** 4X AGP, ATI Rage 128 Pro chip, 32MB of SDRAM, 300-MHz RAMDAC, video capture, TV-out, bundled 3D games–Activision's Heavy Gear 2 and GT Interactive's Need for Speed IV. **SUMMARY:** Feature-rich ATI board does well in every game but Quake 3, and a $40 price slash makes it even more affordable.
9	Matrox Marvel G400-TV 800/361-1408 www.matrox.com/mga	Feb 00	$299	87	Excellent	Very good	Excellent	**FEATURES:** 4X AGP, Matrox G400 chip, 16MB of SGRAM, 300-MHz RAMDAC, TV tuner, TV-out, Avid Cinema, bundled 3D games–Unisoft's Tonic Trouble and Gremlin Interactive's Wild Metal Country. **SUMMARY:** Feature-packed board produces good image quality. Makes a great choice for editing home videos.
10	ELSA Gladiac 800/272-3572 www.elsa.com/america	NEW	$349	84	Excellent	Excellent	Very good	**FEATURES:** 4X AGP, NVidia GeForce2 GTS Chip, 32MB of DDR SGRAM, 350-MHz RAMDAC, choice of two downloadable 3D games. **SUMMARY:** The new NVidia chip set helps this card claim second place in 3D performance at the second highest price. Lighting effects look good in Quake 3.

Best Buy

TEST PC WORLD CENTER **HOW WE TEST** We test boards under Windows 98. Business tests include PC WorldBench 98. Our 3D-gaming score is based on four games, each evaluated on frame rate and image quality. We test AGP boards in a Dell Dimension XPS T600 with a Pentium III-600 CPU and 128MB of RAM. Overall AGP rating is based on performance (42.5 percent), features (27.5 percent), price (20 percent), and support policies (10 percent). For all scores, higher is better. Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

NVIDIA'S LATEST CHIP SET, the GeForce2 GTS, debuts this month with two new cards. The 3D Prophet II GTS from Hercules turned in the fastest 3D performance we've measured, with ELSA's Gladiac hot on its heels. Unfortunately, both cards also set new highs in price. The speedy, affordable Matrox Millennium G400 Max moves up a notch to first place. Next month, we review 3dfx's hotly anticipated card, the Voodoo 5. ▶

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PC WORLD

TOP 10 MODEMS

	INTERNAL V.90 MODEM	Month tested	Street price (5/23/00)	Overall rating	56-kbps downloads/ 33.6-kbps transfers (min:sec per MB)	Comments
1	Viking 56K Windows ISA Modem 800/338-2361 www.vikingcomponents.com	Feb 00	$40	83	3:40/6:11	**FEATURES:** Supports K56flex, ISA card, Lucent chip set, V.80 videoconferencing, MNP-10 error control, MNP-10EC, distinctive ring, voice mail, QuickLink Message Center III software. **SUMMARY:** Good performance and a great price keep this controllerless ISA modem at the top. Voice features and a robust software bundle add to its value. Includes a five-year warranty and 24-hour toll-free support.
2	Trendware Trendnet High Speed Internal Voice/Fax PCI Modem 888/326-6061 www.trendware.com	Apr 00	$30	83	3:12/5:51	**FEATURES:** Supports K56flex, PCI card, Rockwell chip set, V.80 videoconferencing, distinctive ring, voice mail, speakerphone, Cheyenne BitWare software. **SUMMARY:** True to its name, the Trendnet races across both clean and impaired lines to achieve the fastest 56-kbps download speed on the chart. Five-year warranty and bargain price that drops $10 give this software modem a competitive edge.
3	Creative Labs Modem Blaster Flash 56 PCI 408/719-5180 www.creative.com	Feb 00	$40	83	3:39/5:41	**FEATURES:** Supports K56flex, PCI card, Rockwell chip set, MNP-10 error control, V.80 videoconferencing, distinctive ring, voice mail, speakerphone, ASVD, Caller ID, QuickLink Message Center III software. **SUMMARY:** Full-featured controllerless modem has stellar performance, especially when uploading data via 33.6-kbps transfers. Backed by daily tech support and a three-year warranty.
4	Zoom FaxModem 56K PCI Dualmode 800/631-3116 www.zoom.com	Feb 00	$60	81	3:45/6:07	**FEATURES:** Supports K56flex, PCI card, Lucent chip set, V.80 videoconferencing, distinctive ring, voice mail, Communicate Lite software. **SUMMARY:** Reasonable price and attractive voice features, but 33.6-kbps transfers are a bit slow. Also, Zoom offers proprietary software that protects its modems from digital line voltages. Backed by long support hours and a seven-year warranty.
5	Creative Labs Modem Blaster Flash 56II ISA 408/719-5180 www.creative.com	Feb 00	$70	81	3:22/5:42	**FEATURES:** Supports K56flex, ISA card, Rockwell chip set, controller-based, MNP-10 error control, V.80 videoconferencing, distinctive ring, voice mail, speakerphone, ASVD, Caller ID, QuickLink Message Center III software. **SUMMARY:** Establishes reliable connections, controller-based, and reasonably priced for its set of features. Three-year warranty and daily support but no toll-free calls.
6	3Com U.S. Robotics 56K Winmodem PCI 800/638-3266 www.3com.com	Feb 00	$60	81	3:41/5:49	**FEATURES:** Supports x2, PCI card, USR/TI chip set, V.80 videoconferencing, distinctive ring, Caller ID, RapidComm software. **SUMMARY:** Data transfer with the test Ascend dial-up server could be better, but this model still turns in solid performance overall. 3Com offers a lifetime warranty and 10 hours of tech support daily, Monday through Friday, but the call is on your dime.
7	Diamond Multimedia SupraMax 56K PCI 800/468-5846 www.s3.com	Apr 00	$40	80	3:27/5:41	**FEATURES:** Supports K56flex, PCI card, Conexant chip set, MNP-10EC, V.80 videoconferencing, distinctive ring, voice mail, Caller ID, FaxTalk software. **SUMMARY:** Above-average performance on the test Ascend and 3Com dial-up servers. This modem also ran particularly fast on impaired lines. Five-year warranty and long support hours, but tech support requires a toll call.
	PC CARD V.90 MODEM					
1	3Com Megahertz 56K Global GSM and Cellular Modem PC Card 800/638-3266 www.3com.com/mobile	Apr 00	$199	87	3:34/5:59	**FEATURES:** Supports x2, 3Com/TI chip set, direct cellular connection, voice mail, speakerphone, Caller ID, digital line voltage protection and alert, Xjack pop-out phone jack, BVRP Phone Tools software. **SUMMARY:** Loaded but expensive Linux- and Windows-compatible modem performs well with downloads. Xjack feature and digital line protection enhance its mobile value. Comes with a lifetime warranty.
2	Zoom PC Card 56K Dualmode FaxModem 800/631-3116 www.zoom.com	NEW	$100	82	3:31/5:51	**FEATURES:** Supports K56flex, Lucent chip set, V.80 videoconferencing, distinctive ring, digital-line voltage protection and alert, QuickLink II Fax software. **SUMMARY:** With the fastest performance on the PC Card chart, this newcomer also includes key mobile features such as an energy-saving sleep mode and a great price, but its warranty is good for only two years.
3	Psion Dacom Gold Card Global 56K + Fax 800/997 7466 www.psiondacom.com	Apr 00	$165	80	3:50/5:38	**FEATURES:** Supports K56flex, Rockwell chip set, direct cellular connection, MNP-10 error control, MNP-10EC, V.80 videoconferencing, callback, manual volume control, digital line voltage protection and alert, BVRP Phone Tools software. **SUMMARY:** Geared toward roadies, this well-priced modem works with some GSM cell phones and comes standard with a lifetime warranty.

Best Buy

For reviews of products that didn't make the chart, visit www.pcworld.com/t10modems.

TEST PC WORLD CENTER **HOW WE TEST** We test V.90 (56-kbps) and V.34 (33.6-kbps) performance over a Telecomm Analysis Systems simulated phone network. We connect each modem to two common Internet service provider modems—Ascend's Max 6000 and 3Com's Total Control. Using each ISP modem, we perform two tests. In the Network Model Coverage test, we send a .zip file over several different line conditions. In the File Type test, we send a mix of four files—graphics, text, program, and compressed—over one line condition. We average the results for the two ISP modems to calculate NMC and FT scores, which make up, respectively, 60 and 40 percent of the total performance score. Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

INTERNAL MODEM PRICES continue to decline—with the average price falling from $60 to $50 over the past year. On the other hand, PC Card modem prices reflect the cost of such enhanced mobile functionality features as controller-based circuitry, direct cellular capability, and digital-line voltage protection. Zoom's latest PC Card follows the mobile trend, but its price undercuts the competition and its performance is first-rate. ■

HERE'S HOW

ILLUSTRATION: PHIL ANDERSON

WINDOWS TIPS SCOTT DUNN

Folders: It's All in the Details View

ALL Versions

EVEN THE MOST DESCRIPTIVE file or folder name does not tell you much about what's behind the icon. How do you determine how large a file is, when a folder was created, or what that cryptic three-letter file extension means? Well, you could give your mouse a workout, or you could find out at a glance by using Details view in Windows Explorer or in an open folder window. These days, Windows Explorer and open folder windows are functionally equivalent, so we'll use the terms *Explorer* and *folder* interchangeably.

Explorer's View menu has always provided a number of ways to represent the files, folders, and drives it shows in its file pane—the window on the right. Options include large icons running horizontally by default (*View•Large Icons*), small icons running horizontally (*View•Small Icons*), small icons running vertically (*View•List*), or a tablelike format with columns of information about each file (*View•Details*). The Large Icons view is fine when you are initially getting used to Windows, but most users soon come to prefer the extra information that Details view provides.

Here are some tips to ensure you get the view you want when you open a folder. Start by trying these suggestions on only one folder. If you want to apply the settings to all your folder views, the last tip in this section ("Customize one, customize all") tells you how. All of them will work if you have installed the Desktop Update portion of Internet Explorer 4 or if you're running Windows 98 or later.

Get the columns of your choice: By default, Explorer displays Details view information in nice neat columns. If you don't need a particular detail, you can eliminate its column to save space. Simply position your mouse pointer over the divider to the right of the column name until the pointer turns into a double arrow; then drag left, shrinking the column until it completely disappears. If you ever want the column back, position the mouse pointer just to the right of the same divider (you'll see that this double-arrow pointer's vertical line is hollow) and drag to the right until you see the column heading again. For the Attributes column in Windows 9*x*, you can use the same method; or you can choose *View•Folder Options* or *View•Options*, click the *View* tab, uncheck *Show file attributes in Detail View*, and click *OK*. The Attributes column will not disappear until you change the selected folder. (To customize Details and columns in Windows 2000, see the next section, "Get Detailed With Windows 2000 Explorer.")

Get more details: You can obtain even more information without using Details view at all. In Explorer, **<Alt>**-double-click a file, or select a file or folder and press **<Alt>-<Enter>** to see its Properties sheet. This dialog box lists the usual data you'd find in Details view. It also reports the amount of disk space allocated for the file or folder, identifies a path you can drag over to highlight and then copy and paste

FIGURE 1: PUT INFORMATION WHERE you want it by dragging column headings in Details view.

the contents into other locations, and specifies the times and dates the file was created and last accessed. (The access date is not available for folders.) If you want a tool for modifying this information, see "Windows Toolbox" on page 210.

Sort it out: Want to see your files arranged by date last modified? Or maybe the oldest ones first? Or grouped by file type? No problem. Just click the column heading to sort by that attribute. Click a second time to reverse the sort order. Windows 2000 gives you more visual feedback for this feature: An upward-pointing arrow on the sorted column heading shows the files in ascending numeric or alphabetical order, while a downward-pointing arrow shows the files in the opposite order.

Order columns around: Don't like the order of columns in Details view? Drag and drop the column heading onto the dividing line between any two columns. When you release the mouse button, the entire column will move (see **FIGURE 1**).

For your size only: I've described how to change column width by dragging the dividing lines between column headings. You can also force an individual column to snap to the width of its widest element by double-clicking the right edge of the column heading. To resize all columns at once, each to the width of its longest element, hold down **<Ctrl>** and press the plus key (**+**) on the numerical keypad.

View a wider angle: If your file names tend to be long, or if you use a large system font, you may have difficulty fitting all the information into a single window without scrolling horizontally. When you don't need the file preview area on the left side of the Web view in Windows 9*x*, you can gain a little more horizontal room by unchecking *View•as Web Page*. In Windows 2000, choose *Tools•Folder Options*. In the General tab under Web View, select *Use Windows classic folders* and click *OK*.

Customize one, customize all: The most efficient way to get the desired look for the largest number of folders is to apply some basic attributes to all folders and customize individual folders. To do that, close all Explorer and folder windows except one. Give that one the view characteristics you want for all your folder windows. Choose *View•Folder Options* or *View•Options* (Windows 9*x*) or *Tools•Folder Options* (Win 2000). Click the *View* tab and examine the options listed under Advanced settings. Make sure that *Remember each folder's view settings* is checked. Check or select any other options you want to include.

When you like the way everything looks, click *Apply*. Then click the *Like Current Folder* button in this dialog box (see **FIGURE 2**). Click *Yes* to confirm your decision. This saves the customized view state for all folders, but remember that any subsequent changes you make to specific folders will be saved only with those individual folders, not globally.

Note that this option doesn't save every aspect of your folder. For example, if you set a background picture for a folder by choosing *View•Customize this Folder*, do not expect to see that picture in all folders—you'll have to make that change to individual folders. Similarly, you will have to adjust the sorting of files (by size, name, date, or any other attribute) for each folder individually because the sort order is not saved globally.

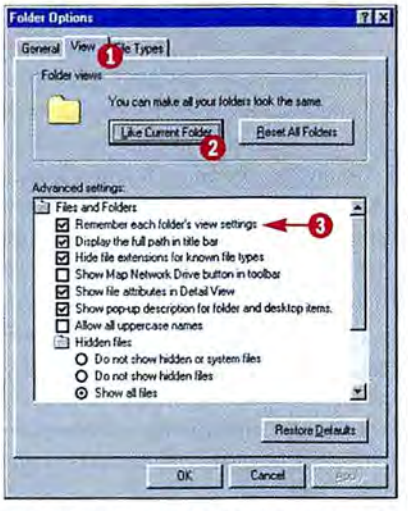

FIGURE 2: GET THE VIEW you want: (1) Use this dialog box to alter one folder. (2) Click here to apply a template to all folders. (3) Check this option to change individual folders.

GET DETAILED WITH WINDOWS 2000 EXPLORER

DETAILS VIEW IN Windows 2000 gives you more information than you dreamed possible. But you need to know how to get the information without being overwhelmed.

First, the basics: To get some extra information in Explorer (or a folder window), choose *View•Choose Columns*. (If you don't see this command, choose *View•Details* to make sure that this folder is present in Details view.) In the Columns Settings dialog box, check the columns that you want to see in Details view, and uncheck the ones you want to eliminate. (Selecting the Show or ▶

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Find a powerful free alternative to commercial antivirus utilities at www.pcworld.com/heres_how/freeware/antivirus.

You just upgraded (or might upgrade) to a DSL or cable connection? See how to beat the broadband blues at www.pcworld.com/heres_how/broadband.

Hide button is equivalent to checking or unchecking an item.) You can set the column order by selecting a column name in the dialog box and clicking *Move Up* or *Move Down* a desired number of times. Then click *OK*.

After the dialog box is closed, you can still make changes by dragging and dropping, as explained in the tip "Order columns around" in the previous section. For the most common options, right-click a Details view column heading; then, from the menu that appears, select the checked items to uncheck them and vice versa (see **FIGURE 3**). If you need to use the dialog box, open it from that menu by choosing *More*. Note, however, that this command and some other menu options are unavailable in System folders such as My Computer and Control Panel.

When might you want to use one of these sometimes confusing options? Check www.pcworld.com/augoo/wintips for more information on the new Details options in Windows 2000. Among these is the Accessed column, which lets you sort a folder's contents based on the date each file was last opened, even if the contents didn't change.

STILL ANOTHER INFOTIP TIP

IN THE LAST ISSUE, I described how to customize and create your own InfoTips and ToolTips—the pop-up text that appears when you hold your pointer over certain objects for a few seconds (see www.pcworld.com/juloo/wintips). If you have Windows 2000, you can easily create a tip for yet another type of file—the ubiquitous shortcut file. Right-click any shortcut (identified as such by an arrow in the lower left corner of its icon), choose *Properties*, and click the *Shortcut* tab. In the Comment box, type the text you want to appear when your pointer hovers over the icon. This could include a description of the contents of a folder or file shortcut, or a reminder on a program's keyboard shortcuts. The box is small, but the text that you type scrolls, so you can enter up to six sentences. When you finish, click *OK* and then move your pointer over the shortcut to review the text that you entered.

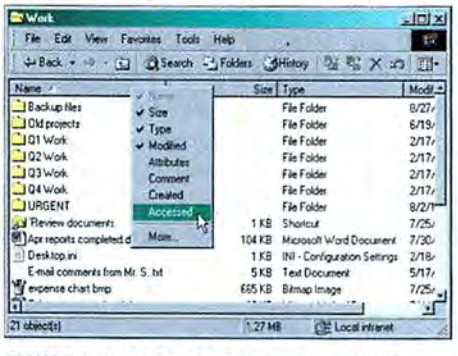


FIGURE 3: CHOOSE A VIEW by right-clicking a column heading, or choose *More* for more options.

BETTER AUTOMATIC SYSTEM BACKUPS

WHEN I RUN INTO a Registry problem and try to reboot several times, I can easily overwrite the good Registry backups, since Windows 98 keeps only the last five. Is there a way to modify the Registry so that it keeps more than five backups?

Tim Chu, Knoxville, Tennessee

SIMPLY REBOOTING several times in a single day shouldn't overwrite any of your good Registry backups—the Registry Checker Tool (scanregw.exe, ScanReg for short) that creates these backups does so only once a day, not every time you reboot. Rebooting merely causes ScanReg to analyze the Registry and, if it finds a problem, replace it with the most recent backup. The bad Registry is backed up to a special file, Rbbad.cab (for "Registry backup bad"), where it won't be used for future restoration. If both the Registry and the most recent Registry backup file are corrupt, Windows merely attempts to replace the existing Registry with this recent corrupted version.

It's a frustrating situation to be sure, but at least none of the earlier (and presumably good) backups ScanReg created get damaged or overwritten. Only Rbbad.cab would get replaced each time. Even so, you might feel safer with more than five Registry backups. You can tell ScanReg to increase the number of backups, and you don't have to modify the Registry: All the settings you need to change reside in a file called scanreg.ini, which you can modify in any text editor.

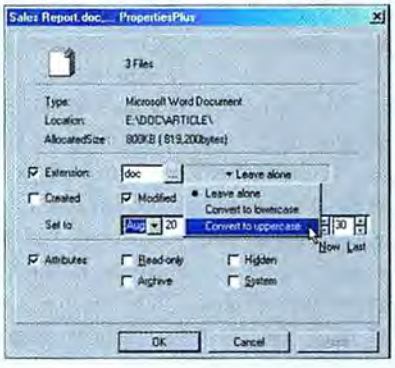
Choose *Start•Run* and type **c:\windows\scanreg.ini** (your path may differ); then press **<Enter>**. Scanreg.ini should open in your assigned text editor (Notepad is the default). Look for a line that reads MaxBackupCopies=5. Change the number in this line to any amount from 0 to 99. For example, if you want Windows to keep 25 copies of the Registry, edit the line so that it reads **MaxBackupCopies=25**.

You'll find more tips at www.pcworld.com/heres_how. Send your questions and tips to scott_dunn@pcworld.com. We pay $50 for published items. Scott Dunn is a contributing editor for PC World *and a principal author of* The PC Bible, 2nd Edition *(Peachpit Press, 1995).* ■

WINDOWS TOOLBOX

More Oomph for Your Properties Sheet

SOMETIMES, THE SOFTWARE you want most isn't another program you have to launch, but something that improves the way Windows works. Such a product is PropertiesPlus from Kish Designs. Once you've installed PropertiesPlus, just right-click any file and choose *PropertiesPlus*, an enhanced version of the normal Windows Properties dialog box. With it, you can change a file's extension without first setting the option to display extensions in Explorer, and you can modify a file's attributes and its Created, Modified, and Accessed time stamps. You can use a single dialog box to make all these changes for a single file, for multiple files, or for all of the files in a folder. Don't worry about the price, either—PropertiesPlus is free. You can download it from FileWorld or from the creator's home page at www.ne.jp/asahi/cool/kish.



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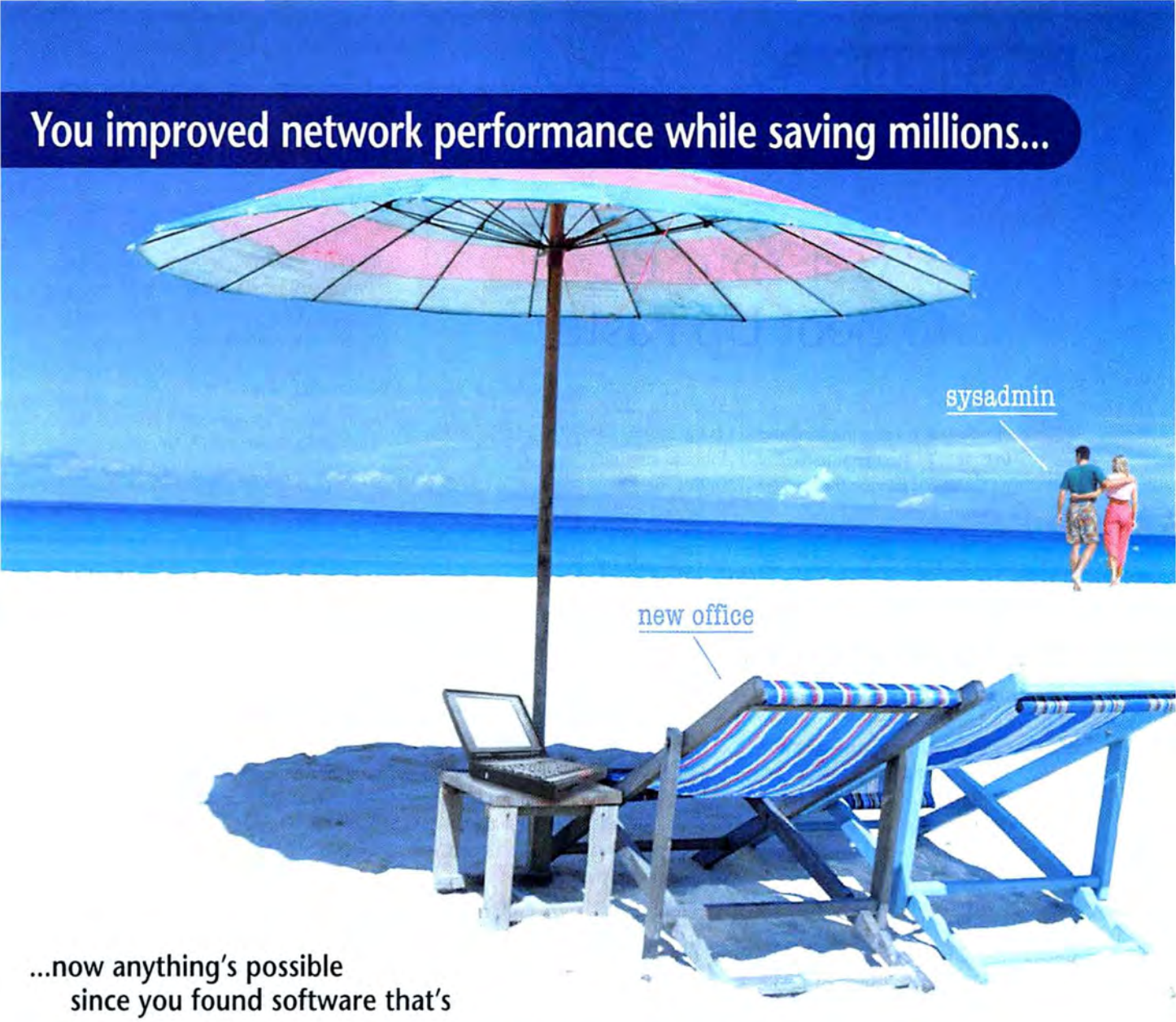

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YOUR QUESTIONS ON: Protecting file associations ◆ Fixing device drive letters

Get Your PC to Boot Up Faster

HOW CAN I SHORTEN the amount of time that it takes my computer to boot up? I don't want to have to wait so long between turning on the machine and getting down to work.

Jim Albrecht, Naperville, Illinois

ONE OBVIOUS STEP is to reduce the number of programs that load at boot-up. These include diagnostics, favorite applications, and unnecessary modules inserted by installation programs.

Deciding which programs to keep is a matter of judgment, for the most part. For example, you want your antivirus program's background autoprotector running at all times, but you don't need to load the whole antivirus program and scan your hard drive every time you boot.

To find start-up programs, select *Start•Run*, type **msconfig**, and press **<Enter>**. This takes you to Windows 98's System Configuration Utility. Click the *Startup* tab. You'll find a list of commands, each with a check box (see **FIGURE 1**). Uncheck any you think you might not use (you can always go back and recheck them later). Repeat the process in the *Autoexec.bat* and *Config.sys* tabs (if they're empty, that's fine). When you're done, click *OK*, reboot, and then see how much time you've saved.

Not enough? Defragging your hard drive every other week will also help to make your system boot faster.

Finally, your system start may be slowed by a large font collection. To trim the number of fonts loading at boot-up, select *Start•Run*, type **fonts**, and press **<Enter>**. You can then drag selected fonts to another folder to keep them out of the boot process (they'll still be available should you want them). For more on handling fonts, see "Manage Your Fonts" in the October 1999 *Answer Line* (www.pcworld.com/oct99/al).

Quick, Convenient Defrags

RICHARD GOBEL of Rio Verde Playa, Spain, found a simple way to launch a defrag. In Windows Explorer, select *View•Folder Options* (or *View•Options*). Click the *File Types* tab and scroll down the list of file types to select *Drive*. Click *Edit*, then *New*. In the *Action* field, type **Quick Defrag**. In the *Application used to perform action* field, type **c:\windows\defrag.exe "%1" /noprompt**. Click *OK*, then *Close* twice. Now, to defrag a drive, simply open *My Computer*, right-click the drive, and select *Quick Defrag*.

EMPTYING TEMPORARY INTERNET FILES FOR REAL

I RECENTLY commanded Internet Explorer to clear out my Temporary Internet Files folder, but afterwards I still had 3873 files taking up 25.6MB. How do I truly empty this folder?

L. Lee Brown
Bay Shore, New York

THE OFFICIALLY sanctioned way to empty the Temporary Internet Files folder in Internet Explorer is to select *Tools•Internet Options* and click the *Delete Files* button on the General tab. This should remove most of the unwanted files, but there's a big one left. It's called index.dat, and it doesn't go away or even shrink as the cache changes—it just gets bigger. What's more, you cannot delete this file from inside Windows.

To get rid of index.dat bloat, select *Start•Shut Down*. Click *Restart in MS-DOS mode*, then *OK*. At the DOS prompt, type **del c:\windows\tempor~1\index.dat** if you've got Internet Explorer 4.*x*, or **del c:\windows\tempor~1\content.ie5\index.dat** if you're using IE 5. Press **<Enter>**, then reboot. You'll still have an index.dat file (if Windows doesn't find one, it creates one), but the file will now be much smaller.

On some systems, clicking the Delete Files button doesn't shrink C:\Windows\Temporary Internet Files at all. That's because something—probably setting up a network or installing a wayward application—has caused Internet Explorer to change where it stores temporary files. To find out where the real cache is, go to Internet Explorer and select *Tools•Internet Options*. On the General tab, click *Settings*. In the Settings dialog box, click *View Files* to bring up your real cache folder.

While you've got the Settings dialog box up, you can move the cache back to the original location—a safe plan if you're the only one using your computer. Click *Move Folder*, then select *C:\Windows* from the resulting folder tree (Windows ▶

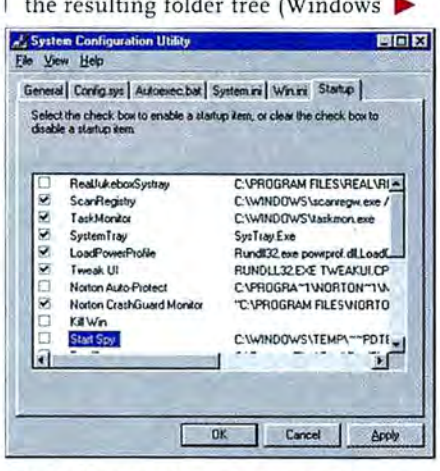
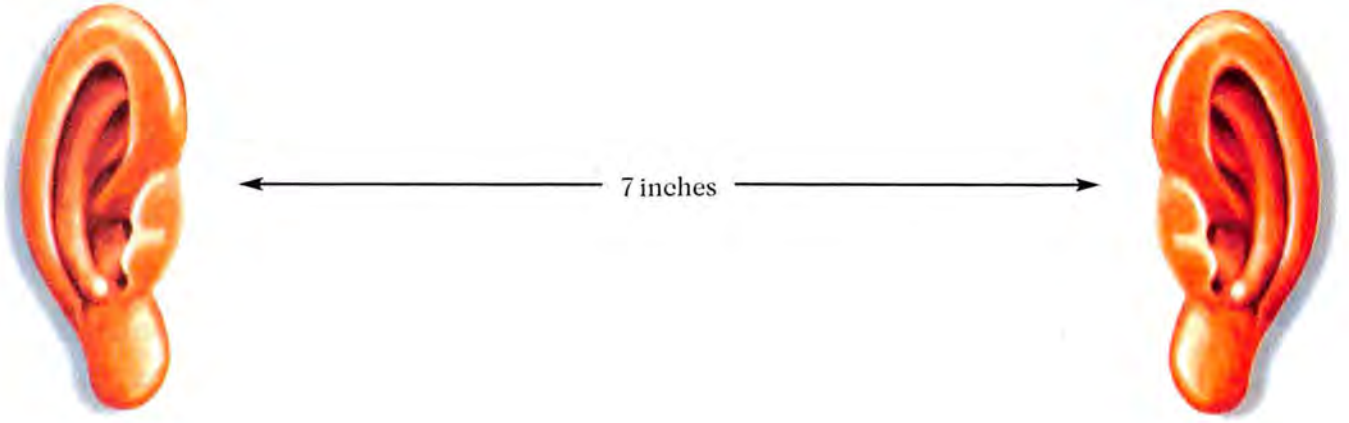


FIGURE 1: TO SPEED boots, uncheck items that load in Win 98's System Configuration Utility.

ILLUSTRATIONS: PHIL ANDERSON (BOTTOM); JEFFREY PELO (TOP)



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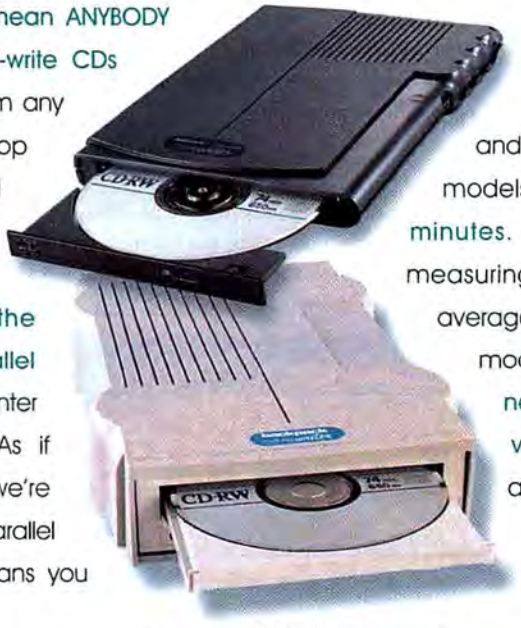

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puts the cache in a folder called Temporary Internet Files within the one you pick). Click *OK* twice, then *Yes* when asked to reboot. After rebooting, you can safely delete the older folders.

KEEP YOUR CD-ROM DRIVE IN ONE PLACE

REPARTITIONING my hard drive causes my CD-ROM drive to change its drive letter. Is there some way I can give the CD player a fixed letter from the start that won't change?

Joe Grabowski
Oakton, Virginia

TO GIVE YOUR CD-ROM drive an unchanging drive letter, right-click *My Computer* and select *Properties*. Click the *Device Manager* tab. In the resulting list of peripherals, double-click *CDROM*. Below it will appear a description of your particular CD-ROM drive. Double-click that to bring up your CD-ROM drive's properties. Click the *Settings* tab.

In the 'Reserved drive letters' box, change both the 'Start drive letter' and 'End drive letter' options to your choice of a permanent letter. This letter should be late enough in the alphabet that it won't interfere with Windows' method of naming hard drive partitions; you can consider anything after J: as bound to be safe. Click *OK* when you're done.

PROTECT FILE ASSOCIATIONS

INSTALLING AND uninstalling applications plays havoc with my file associations. For instance, when I double-click a .jpg file, I get the last program I installed that thinks it's the right tool for the job, not the program I want to use. Can I prevent programs from changing that association?

Abdel Guettatfi, San Francisco

MOST INSTALLATION routines assume that their program is the only one on your computer. The best way to protect your file associations is to back up the ones that you want to protect. This involves entering the Registry. Here's the proper backup procedure:

Select *Start•Run*, type **regedit**, and press **<Enter>**. Navigating the left pane as if it were Windows Explorer, go to the folder beneath My Computer\HKEY_LOCAL_MACHINE\SOFTWARE\Classes for the file extension you want to protect—for instance, My Computer\HKEY_LOCAL_MACHINE\SOFTWARE\Classes\.jpg. With that folder open, select *Registry•Export Registry File*. Give the file a name (**jpg**) and save it (see **FIGURE 2**). This won't back up the entire Registry—just the part with the .jpg association.

Now, should any newly installed program decide that it's the one in which you want to edit your .jpg files, simply find the file you saved (jpg.reg) and double-click it.

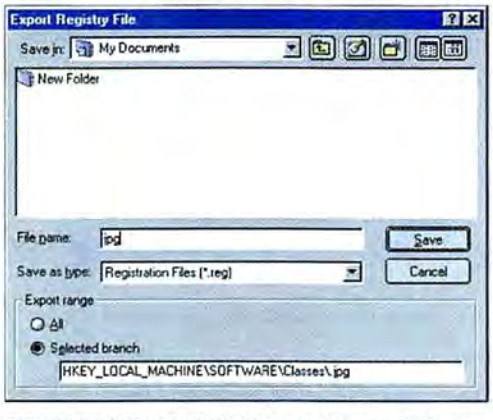

FIGURE 2: YOU CAN PROTECT your file associations by backing them up in the Windows Registry.

SEARCHING IN ARCHIVES

HOW DO I FIND a particular file that I know is in a .zip or .cab archive file, without knowing exactly which .zip or .cab file? For instance, how do I find a particular .inf file that could be in any one of the many .cab files on the Windows CD-ROM? Trying to look through all of them would be a chore I'd prefer to avoid.

Bob Vrooman
North East, Pennsylvania

THERE ARE TWO issues here: searching for files by file name, and searching for files by contents. I'll start with the filename search. Both the .zip and .cab compression formats store file names as plain, uncompressed ASCII text, so you can use any file search program to identify the archive. To use Windows' own File Finder, select *Start•Find•Files or Folders*. In the 'Named' field under the *Name & Location* tab, enter ***.cab; *.zip**. Include the appropriate path in the 'Look in' field. Enter the file name you're looking for in the 'Containing text' field (in Windows 95, you must click the *Advanced* tab to get to this field). Press **<Enter>** or click *Find Now*. You'll get a list of every archive that contains a file with that name.

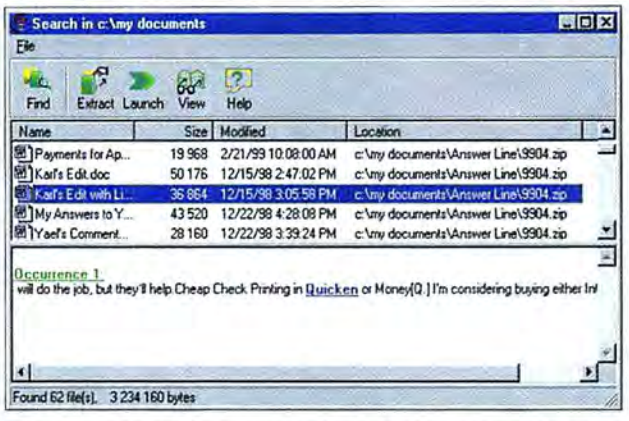

FIGURE 3: BIGSPEED ZIPPER searches for text in .zip files and shows the compressed file, the .zip file it's in, and its first instance of text.

Unfortunately, if you don't know the file name, Windows' File Finder is of no use. It simply can't find text in a file that's within another file. Luckily, some utilities can (for .zip files, anyway; I know of none that search within .cab files).

One such utility is BigSpeed Zipper, a $29 shareware program you can download from www.bigspeedsoft.com or www.fileworld.com. It's a basic compression program with one unique feature: Click the *Locator* button and you get a nice, easy-to-use tool for searching .zip files (see **FIGURE 3**). Version 3, just out, has several new features.

online *Find files from this article at www.fileworld.com. Send your questions to answer@pcworld.com.* Answer Line *pays $50 for published items. Contributing Editor Lincoln Spector writes and performs computer humor. His column* Gigglebytes *appears in 13 publications in four countries.* ■

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Use Your Cell Phone as a Wireless Modem

ABOUT A YEAR ago I realized I was a prisoner in my own home office. Determined to venture out into the light more frequently, I passed my aging Pentium desktop to my 7-year-old and bought one of the latest ultraportables. Now, I figured, I could take the show on the road and work at the library, the airport, the coffee shop, or under a shady tree.

It seems like 90 percent of my work revolves around e-mail, so even when my computer is untethered, my work isn't. After resisting the cell phone craze for years, I decided to go mobile, partly because of the promise of wireless Internet access. To my disappointment, I discovered that wireless Web access is easier said than done. Still, if you have some idea of what you're getting into, going online via cell phone is possible, and maybe even worthwhile.

LOOK MA, NO WIRES

I'M NOT TALKING ABOUT receiving e-mail messages, stock quotes, or stripped-down Web pages on your phone's teensy-weensy display. Phones, pagers, and PDAs that use the Wireless Application Protocol may be the latest rage, but I'm talking about something else—using your cellular phone as the "wireless" half of a wireless modem.

Even with the latest digital cellular service, your connection speed is going to be ponderously slow, especially when signal strength is weak. Maybe in a few years you'll be able to connect to the Web wirelessly at ISDN- or DSL-like speeds, but currently the fastest connection that most of us will realize using a digital cell phone is 14.4 kbps—fast enough for basic Web browsing and e-mail, but forget about MP3s and streaming media.

You'll also have to purchase a special cable (about $70 to $100) that connects your phone to your modem. The cable I got came with rudimentary software that lets me transfer phone numbers between the phone and the address book on my notebook (see **FIGURE 1**). It's a good thing, too, because if your experience is like mine, this may turn out to be the only use you get out of the cable.

MORE WIRELESS PERILS WITH ANALOG CELLULAR

ANALOG CELLULAR connection speeds are even slower—usually about 9600 bps. If you're still using an analog cell phone, consider upgrading to digital if the service is available in your area. Dual-mode phones are convenient because they switch automatically from digital to analog mode when you roam out of your home area. Even if you can live with the analog connection's slowness, there's another obstacle waiting—you'll probably need a different cable and a cellular-capable modem to connect.

If these shortcomings of wireless connectivity haven't discouraged you, here's another: Even if you get your phone set up and properly connected to your laptop, you still may not be able to connect to your Internet service provider or other Net connection. For reasons no one can explain to me, my ISP's modems simply don't answer my incoming wireless data calls, even though America Online's modems do.

Once you make a connection, yet another pitfall awaits. If you use AOL or a free ISP with nationwide phone numbers to access your day-to-day work or ISP mail account, you may not be able to get your mail. For security reasons, many ISPs allow access to their mail servers only if you dial in directly, rather than connecting to the ISP's mail server via the Net. If your ISP provides local dial-up numbers wherever you travel, then you don't have to worry about this.

I'm interested to hear your success stories, frustrations, and workarounds ▶

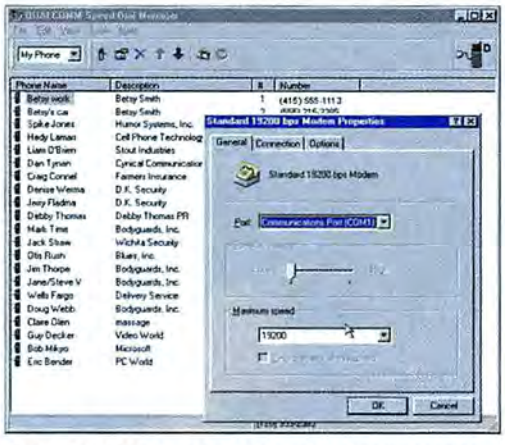

FIGURE 1: A CABLE AND SOFTWARE let you transfer numbers between a cell phone and a notebook or PC.

ILLUSTRATIONS: PHIL ANDERSON (LEFT); JEFFREY PELO (RIGHT)

Take Your AOL Addresses and Run

AMERICA ONLINE stores personal mail folders and address books in nonstandard format and offers no export options when you want to leave the service. Java programmer Duncan MacKenzie (duncanmackenzie.com/aoleave.html) offers address-book and favorite-places converters and is working on a tool for extracting personal folders. To run the small converters, you need Sun's Java Runtime Environment, a multimegabyte download at www.javasoft.com/products/jdk/1.2/jre/download-windows.html.

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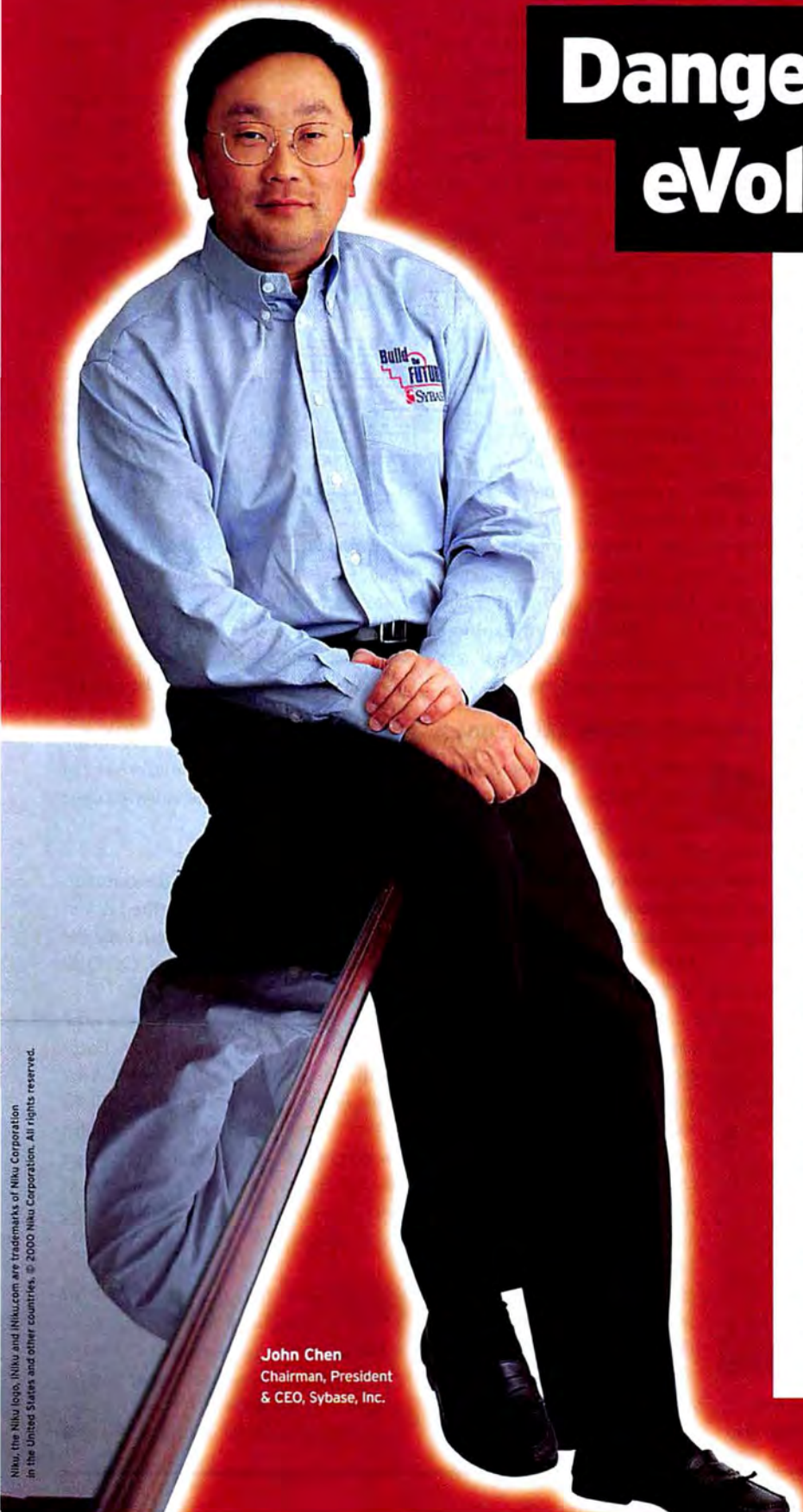

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with cellular access. If you know of a wireless service, phone company, or nationwide ISP that's particularly easy to use with your laptop, send me a note at nettips@spanbauer.com. I'll publish the results in an upcoming column.

BYPASS OUTLOOK EXPRESS'S IMPORT IMPASSE

I ARCHIVED MY e-mail folders on a computer running Internet Explorer 4 and its e-mail client software, Outlook Express 4. I stored the files on a Zip disk, and the system they were created on is now long gone. The new computer has IE 5, and thus Outlook Express 5, installed on it. The problem is, I cannot get Outlook Express 5 to import my OE 4 messages. When I try to import them using *File•Import•Messages• Microsoft Outlook Express 4* (see FIGURE 2), I just get this error message: 'No messages can be found in this folder or another application is running that has the required files open. Please select another folder or try closing the application that may have the files open.' It doesn't matter whether I try importing the message files directly from the Zip disk or from a folder on the hard disk. If you can solve this, I'll owe you eternally!

Rhea Stevens, Sealy, Texas

ETERNITY IS A LONG, long time. But don't sweat it. This one was relatively easy—Microsoft's Knowledge Base explains the problem (see support.microsoft.com/support/kb/articles/q217/2/64.asp). Outlook Express 5 expects that those files will be stored in a folder called Mail, and it grinds to a halt when they're not. Why? Why, why, why? After you're finished screaming, rename the folder the files are stored in as **Mail** (or create a new one named **Mail** somewhere and copy the files to it), and then repeat the import steps that you described in your letter. And here's another important item: During the import process, you have to browse to the folder that contains the Mail folder. If you browse to the Mail folder itself, you'll get the same cryptic error message. Thank you, Microsoft.

The Knowledge Base reports a few other situations where OE 5 may balk at importing messages. If you backed up your OE 5 files to a CD-Recordable disk, the files will be read-only, even if you copy them back to a hard disk. OE 5 gives you the same helpful error message you mention when you try to import read-only files. To work around this sterling Microsoft feature, copy the files to a hard disk or other writable device, select them in Explorer, choose *File•Properties*, and uncheck *Read-only* at the bottom of the General tab.

UPDATE OUTLOOK AREA CODES

I HAVE A RATHER large Contacts list in Outlook with a lot of phone numbers. As you know, the area codes in the United States are changing faster than politicians' opinions. Is there any way to do a global find and replace for data in the Contacts' fields?

Randy Finch, Florence, Alabama

MAYBE, BUT THE PROBLEM is that area codes aren't just changing, they're splitting—you need to know which prefixes go to the new area code and which don't. DialRight Software's DialRight for Outlook 98 and DialRight for Outlook 2000 scan your contacts and make the area code changes for you automatically. You can download a 5.82MB ad-supported demo version of each from FileWorld or from www.dialright.com/download/outlook (these demo versions tell you how many of your numbers need updating, but they don't change the numbers automatically the way the commercial versions do). Pricing for the full versions is based on the size of your database and includes a year of updates. Call DialRight at 877/349-2633 for details.

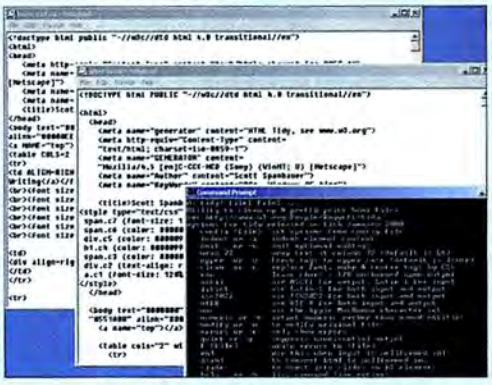
Corex, the company that makes the business-card–scanning software CardScan, has a similar utility called Area Code Fix ($50) that works with CardScan 4, Act 4, Lotus Organizer 97, and Palm Desktop databases. It also includes a year of free updates. See an online demo at www.areacodefix.com/_products/demo_overview.htm.

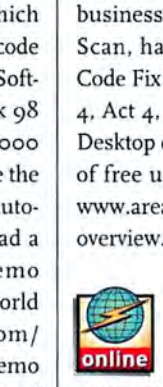
FIGURE 2: TO IMPORT AN ARCHIVED e-mail folder from Outlook Express 4 to OE 5, you must rename the folder Mail.

DOWNLOAD OF THE MONTH

Tidy Up Web Page Errors

IF YOU CREATE SIMPLE Web pages by hand, chances are good that your HTML is as neat as a pin. But if you use a WYSIWYG editor, your pages are very likely to be filled with unnecessary tags, convoluted code, and outright errors that prevent them from displaying properly in some browsers. Dave Raggett's HTML Tidy freeware fixes errors, replaces complex font attributes with style sheets, and indents tags for readability. The 136KB command-line utility even straightens out Word 2000's byzantine Web formats. As lead architect of the HTML 4.0 spec, Raggett should know his tags. You can download HTML Tidy from FileWorld, or you can look for it on Raggett's site at www.w3.org/People/Raggett/tidy.





Find files from this article at www.fileworld.com/magazine. Send questions and tips to nettips@spanbauer.com. We pay $50 for published items. Scott Spanbauer is a contributing editor for PC World. ■

We All Know Who Invented The Automobile
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Use Tables to Enliven Document Formats

GIVE YOUR DOCUMENTS more impact by using Word or WordPerfect tables to make page layouts more colorful and captivating. As **FIGURE 1** shows, you can create colors and alignments in tables that would take a long time to do with text boxes and graphical tools.

Word 97 and 2000: To create a table anywhere on the page, select *Table•Draw Table*. Put table cells where you need them by clicking and dragging with the table-drawing mouse pointer, which is easier to use than the *Insert•Table* command. To turn off the table-drawing mouse pointer, simply choose *Table•Draw Table* again or click the *Draw Table* icon (the first option on the Tables and Borders toolbar).

The lives of a cell: Normal text can't appear next to a table cell, so create cells for text as part of the table. Adjust the position and size of cells by moving the mouse pointer over a border until the pointer changes into a double-headed arrow. Then drag the border to a new position. To equalize height or width, select the cells and choose either *Distribute Rows Evenly* or *Distribute Columns Evenly* on the Tables and Borders toolbar.

Crossing the border: To remove border lines from your table, click *Table•Select Table*, then select *Format•Borders and Shading*. Under the Borders tab of the Borders and Shading dialog box, select *None*, and click *OK*. To add a color or pattern background to a cell or group of cells, click in the cell or select a group of cells, choose *Format•Borders and Shading*, and click the *Shading* tab in the Borders and Shading dialog box. Select a color for the cell in the Fill area, or choose a pattern or percentage of shading from the Styles list in the Patterns area. Click *OK* to apply the background.

Tabling text: To align text within a cell, select it, and click the desired text alignment icon (*Align Left, Center, Align Right,* or *Justify*) on the Formatting toolbar. Format text to include a contrasting text color for cells with color backgrounds by selecting the text and then choosing *Format•Font*. After making your changes in the dialog box, click *OK*.

WordPerfect 8 and 9: To create a table you can position anywhere on the page, select *Insert•Table*. Confirm that *Drag to create a new table* is checked, set the number of rows and columns for the table, and click *Create*. Click and drag the table to its new location with the hand-and-rectangle mouse pointer. To move the table, place the mouse pointer over the sizing border until it becomes a four-way arrow, then click and drag the table to a new spot. Adjust cell size by moving the mouse pointer over a border until the pointer becomes a double-headed arrow, and then dragging the border to a new position.

Cell division: To split a cell into multiple cells, move the mouse pointer over the cell border until it changes into a double-headed arrow, and right-click. Select *Split Cell* from the context menu, and pick *Columns* or *Rows* in the Split Cell dialog box. Specify the number of new cells, and click *OK*.

Invisible borders, colorful backgrounds: To remove border lines from a table, drag across the table to select it, right-click, and choose *Borders/Fill* from the context menu. Click the *Cell* tab, then the button to the right of 'Inside', and select the upper left 'X' icon (*<None>*). Repeat for 'Outside', and click *OK*. To add a color or pattern background, right-click in a cell or group of cells, choose *Borders/Fill* from the context menu, and click the *Cell* tab in the Properties dialog box. Click the *Fill* button, choose a pattern for the background, click the *Foreground* button, choose a color for the fill, and click *OK*.

Find additional tips at www.pcworld.com/heres_how. Send questions and tips to george_campbell@pcworld.com. We pay $50 for published items. George Campbell is a PC World contributing editor. ■

FIGURE 1: CREATE COLORFUL DESIGN elements and control space in your documents by using tables.

ILLUSTRATIONS: PHIL ANDERSON (LEFT); JEFFREY PELO (RIGHT)

Convert Footnotes to Endnotes and Vice Versa

IT'S EASY TO CONVERT footnotes in a Word document to endnotes, or vice versa, or to swap one for the other in a document that has both. In Word 97 or 2000, select *Insert•Footnote* and then click *Options* in the Footnote and Endnote dialog box. Click *Convert* in the Note Options dialog box; select *convert all endnotes to footnotes, convert all footnotes to endnotes,* or *swap footnotes and endnotes;* and finish by clicking *OK*.

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Stop CD-ROMs from starting when loaded ◆ Four EIDE drives on one motherboard

Increase Your Workspace With Multiple Monitors

PEOPLE SAY A PC never has too much memory or processing power. Windows 98 users can add display space to that list. If you don't mind the cost and the configuration hassles, you can add up to nine monitors with Win 98. Certainly, anyone who continually jumps from browser to e-mail to spreadsheets to databases to other applications will find adding at least one extra screen a boon to productivity.

Adding a second monitor requires four things: a spare monitor, an open PCI expansion slot, and two graphics cards

FIGURE 1: CHECK YOUR monitors' graphics card drivers in Device Manager's Properties.

backed with drivers that support Windows 98's multiple-monitor capability. The monitor and open PCI slot need no setup, but finding and configuring your graphics cards can take some time and energy.

Both your current graphics card and the one you add must use a chip set and driver that support the Win 98 multiple-monitor feature. Microsoft maintains a list of compatible cards, chips, and drivers in its Knowledge Base (search.support.microsoft.com/kb/c.asp). The list you want is either in Windows 98 Display.txt File or in Windows 98 Second Edition Display.txt File. Select *Windows 98* or *Windows 98 Second Edition* from the 'My search is about' menu, and then enter the keyword **display.txt** under 'My question is' to find links to the list you need.

For the name and version of your graphics card's installed driver, right-click *My Computer*, click *Properties*, select the *Device Manager* tab, double-click *Display adapters*, double-click the adapter name that appears, choose the *Driver* tab, and click the *Driver File Details* button (see **FIGURE 1**).

If your installed graphics card—or your second card—isn't on the list, don't fret. Some newer cards that support multiple monitors aren't yet on the list. Check with the cards' manufacturers. Older or less-popular graphics cards not on the list may work if you install the right driver.

Installing the Microsoft drivers included on the Windows 98 CD is wisest. When you're ready to connect your second card, let the Windows 98 *Add New Hardware* wizard select and install the driver. If it can't find a Microsoft driver, consider installing one from the display.txt list that works with your card's graphics chip.

If while installing any device driver Windows says it can't find a needed file on the Windows CD that you know is there, your Registry source path may have been corrupted by another software program. Click *Browse* and point Windows to the the Windows CD's drivers/display folder.

IT'S IN THE CARDS

ANOTHER CONFIGURATION concern is which graphics card is labeled as the primary one. If your PC sees only one graphics card when it starts, it uses that card, no questions asked. But if it finds multiple cards installed, your PC's BIOS designates the one that was installed first as the primary graphics card—and uses it to boot up—while designating the other as the secondary card.

You may expect the card you already use to be the primary card and the card you add to be the secondary card. Unfortunately, that doesn't always happen in systems with AGP slots. The BIOS on many AGP motherboards installs a PCI card before an AGP card. If you currently use an AGP graphics card and want to install a secondary PCI card, you may have to use your AGP card as the secondary card.

To determine which card your AGP system will use as the primary one, install your second graphics card and reboot your system. (Always ground your- ▶

FIGURE 2: A YELLOW CIRCLE in the display's Device Manager listing indicates a problem.

Avoid False Starts

SOME CD-ROMs launch a program automatically when you load them. If you often use one of these—the Windows CD-ROM, for example—to get data, you have to wait for the program to start and then close it. To avoid this, hold down the <Shift> key as you insert the CD-ROM. Another option is to open Device Manager (to find its tab, hold down <Alt> and double-click *My Computer*), double-click *CDROM*, double-click the drive name, click the *Settings* tab, and uncheck the *Auto insert notification* box.

ILLUSTRATION: JEFFREY PELO

FIGURE 3: CHECK THE "Device status" box in the card's Properties for an error message.

self—by touching the metal chassis with the PC plugged in—before working inside your PC. Then unplug the system and go to work.) As your system starts, the screen will announce which card it uses to boot; that's your primary card.

If the primary card isn't your AGP card, check your PC's CMOS setup program. Some recent BIOS versions let you select the primary graphics card manually. Or your PC's manufacturer may offer a BIOS update that adds this functionality.

If your PC still won't let you make your AGP card the primary card, its time to capitulate and reinstall it as the secondary card from the outset. But first, you'll have to uninstall it. Make sure you select its Device Manager entry and click the *Remove* button to delete its listing before turning off the PC and physically removing the card. Then boot your PC and let it set up the PCI card as the primary graphics card. Next, shut down the PC, reinstall your AGP card, boot the PC, and let it set up the AGP card as the secondary card.

The same ideas apply if you have two PCI cards. The PC's BIOS will assign primary and secondary status to specific PCI slots, with primary status typically going to Slot 1. Of course, being able to put any card in any PCI slot is a clear advantage. Check your system documentation to find which PCI slot is Slot 1 on your PC.

Ultra ATA/66 PCI BIOS card
$40, Promise Technology, 800/888-0245, www.promise.com

PLUG AND CHUG

MAKE SURE THE second monitor is attached when you install your second graphics card. If Windows recognizes and installs it, you'll see a prompt to restart your PC. When you do so—if the configuration is going properly—your second monitor will display: 'If you can see this message, Windows has successfully enabled your display adapter.'

After Windows reloads, Device Manager should list both cards. A yellow circle under Display in Device Manager means trouble (see **FIGURE 2**). Double-click the listing and check the 'Device status' box on the General tab (see **FIGURE 3**).

Right-click the Windows Desktop, and select *Properties* to open the Display Properties box. If all is well, the Settings tab will show two monitors, labeled 1 and 2 (see **FIGURE 4**). When you click on the second monitor, Windows will ask you if you want to enable that monitor.

Now you can set the resolution and color depth for the second monitor. You can also adjust the relative position of the two monitors by dragging one of the monitor pictures above, below, or to one side of the other. For optimum software compatibility, however, place the second monitor to the right of the first. Click the *Apply* button, and your second monitor should display your new desktop.

ANY PORT IN A STORM

THE 2GB HARD DISK on my year-old Pentium III system is nearly full. I'd like to install another 2GB drive that currently sits in an unused PC. I've been told that since my system came with DVD and CD-RW drives built in, I don't have room for another EIDE-based drive, so I must buy and install a SCSI adapter card and a new SCSI drive. Does this sound right?

Robert Stevenson, Savannah, Georgia

NO, IT DOESN'T sound right. Most motherboards support four EIDE devices. You only mentioned three EIDE devices in your system. So even if you have a Zip drive or some other EIDE device installed on your PC, you should be able to add that extra hard drive at minimal expense.

Most motherboards carry two built-in EIDE channels, each with its own connector on the motherboard. The connectors are located adjacent to each other and are easy to find. Just pop the cover off your PC and trace your current hard drive cable back to its motherboard connector.

Each channel supports two devices. Some cheap PCs use EIDE cables that have a single device connector. Because your PC came with three EIDE drives, at least one of your cables has two device connectors: one at the end and one near the middle. If the other cable lacks a middle device connector, you must replace it with an EIDE cable that has two device connectors. Either way, you'll wind up with one free connector for your drive. The only other system requirement is a free bay where you'll mount the new drive. (A configuration note: Put both hard drives on one cable and the DVD and CD-RW drives on the other cable so your hard disks will move data at peak speed.)

FIGURE 4: TO AVOID SOFTWARE conflicts, put the second monitor icon to the right of the first.

If you have a fourth EIDE device connected to your system, you can still attach your old drive if you have a free expansion slot. An EIDE expansion card such as the ULTRA ATA/66 PCI BIOS card from Promise Technology will add the extra EIDE ports you need for about $40.

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This Old Notebook

TWO CLASSIC PC upgrades—adding memory and adding a new hard disk—will work for notebooks, too. But keep in mind that introducing external add-ons (connected via a parallel port, USB port, or PC Card slot) can extend the life of an old notebook as well.

CHANCES ARE YOUR OLD notebook has plenty of life left. So instead of spending a grand or more on a new one, you could upgrade the old one for a few hundred dollars and have yourself a faster and more useful notebook.

Two popular desktop PC upgrades—memory and hard drive—are (usually) easy to perform on a notebook. You can add RAM to almost any notebook and boost its performance significantly. While notebook manufacturers generally make the modules only for their current models, third-party vendors like Kingston Technology and Simple Technology supply a wider range of upgrade parts.

Slide-in drives simplify adding larger-capacity hard drives to the newest notebooks. Upgrading older models may require more work, but if you're comfortable with the projects we cover in this column, you shouldn't have any problems.

Though RAM and hard drive upgrades for notebooks cost much more than upgrades for standard-issue desktops, they can still be a wise investment. For example, upgrading a Toshiba Satellite Pro notebook from its original 8MB of RAM and 750MB hard drive to a hefty 40MB of RAM (the maximum) and a 6.4GB hard drive cost us $512 from Kingston and $504 from Simple.

Of course, as illustrated above, external peripherals—simple to install and light in weight—offer another upgrade route.

Two caveats: First, the lack of standardization among portables means you must take time with manufacturers and vendors to tailor your upgrade to your specific notebook and to do some comparison shopping. Vendors' Web sites can help you find the correct parts, even though you may choose not to buy through them. In some cases, you may conclude that the process simply isn't worth the time and effort. Second, consider the following procedures a guide to typical upgrade steps. The actual steps (especially for installing the hard drive) will vary depending on your notebook and on the particular upgrade solution you choose.

Stan Miastkowski is a contributing editor for PC World. ■

THE TOP DOWN

Benefits: RAM, better Windows performance; hard drive, greater capacity
Costs: 32MB RAM upgrade $75–$150, 64MB RAM upgrade $150–$300, hard drive upgrade (2GB–14GB) $250–$1300
Expertise level: Intermediate
Time required: RAM, 15–30 minutes; hard drive, 1–2 hours
Tools required: Various sizes of Phillips screwdrivers, antistatic wrist strap
Vendors: Notebook manufacturers (check their Web sites), Kingston Technology (www.kingston.com), Simple Technology (www.simpletech.com), Crucial Technology (www.crucial.com)

PHOTOGRAPHS: MARC SIMON

BEFORE YOU BEGIN

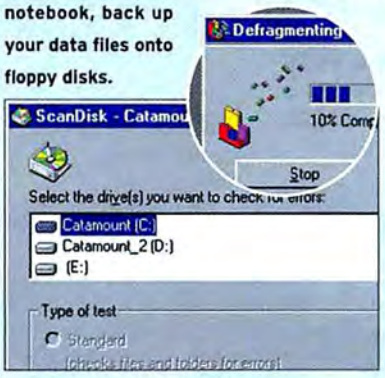
1 Do some research. Find out the amount of RAM in your notebook (watch your display at start-up or right-click *My Computer*, select *Properties*, and look on the General tab) and the size of your hard drive (open *My Computer*, right-click the drive's icon, and select *Properties*). Check the Web site of your notebook's maker to see whether it has upgrades available. Then visit the Web sites of companies that specialize in upgrades (third-party vendors are likely to be cheaper).

System Manufacturer:	Toshiba
Model:	Satellite Pro 400CD

Kingston memory for this system:

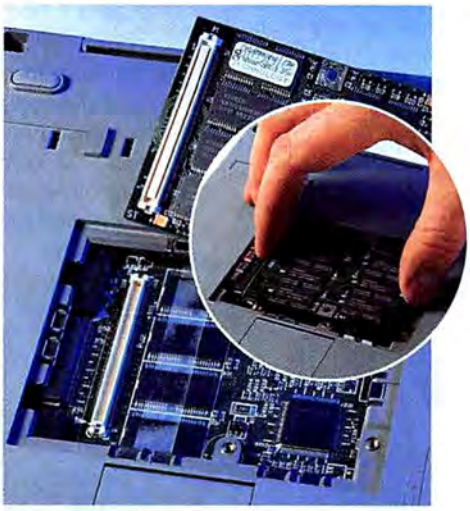
Kingston Part Number	Description	Details
KTT610/8	8MB Module	More Info
KTT610/16	16MB Module	More Info
KTT610/32	32MB Module	More Info

2 Prepare to upgrade. It's an excellent idea (though not essential) to confirm that your notebook's BIOS is up-to-date. Visit the support section of your notebook vendor's Web site. To ensure that your old hard drive is trouble-free (you'll need to copy data from it later), run both ScanDisk (*Start•Programs•Accessories•System Tools•ScanDisk*) and Disk Defragmenter (*Start•Programs•Accessories•System Tools•Disk Defragmenter*). Finally, completely back up your hard drive. If you don't have a tape backup for your notebook, back up your data files onto floppy disks.



ADDING RAM

1 Find the old RAM and install the new RAM. Don a properly grounded antistatic wrist strap (available at your local electronic parts store), and make sure your notebook is turned off and unplugged from AC power. Remove the battery, too. Follow the instructions that came with your RAM upgrade (or check your notebook's instruction manual) to find the RAM sockets. You may need to remove one or more screws to access it. Carefully remove the new RAM from its antistatic packaging, and install it in your notebook. Make sure it's firmly seated in the socket. Reattach the RAM cover and the battery.



2 Check it out. Turn your notebook on. You should see the new amount of RAM displayed on the screen at start-up. If you don't, go back to the RAM compartment (disconnecting power and using the antistatic guard as before) and make sure the new RAM is correctly installed. If that doesn't help, call tech support.

INSTALLING A NEW HARD DRIVE

1 Copy the old to the new. Install the software that came as part of your hard drive upgrade kit, and follow the directions for copying the data from the old drive to the new one.

2 Remove the old drive. Put on a grounded antistatic wrist strap, make sure your notebook is turned off and unplugged, and confirm that the battery is removed. Follow the directions with the upgrade kit to remove the old drive. This usually entails removing screws.

3 Install the new drive. Working carefully, plug in the new drive and secure it with the screws you removed in the previous step. Replace the battery.

4 Get up and running. Turn your notebook on. If the copying step worked correctly, everything will function as before, but you'll have more disk space. If your notebook doesn't automatically recognize the new hard drive, enter your notebook's setup program (procedures vary) and make sure the BIOS for the drive is set to AUTO. (In some cases, you'll have to manually enter the drive parameters.)

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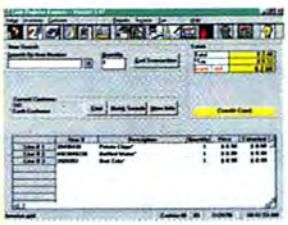

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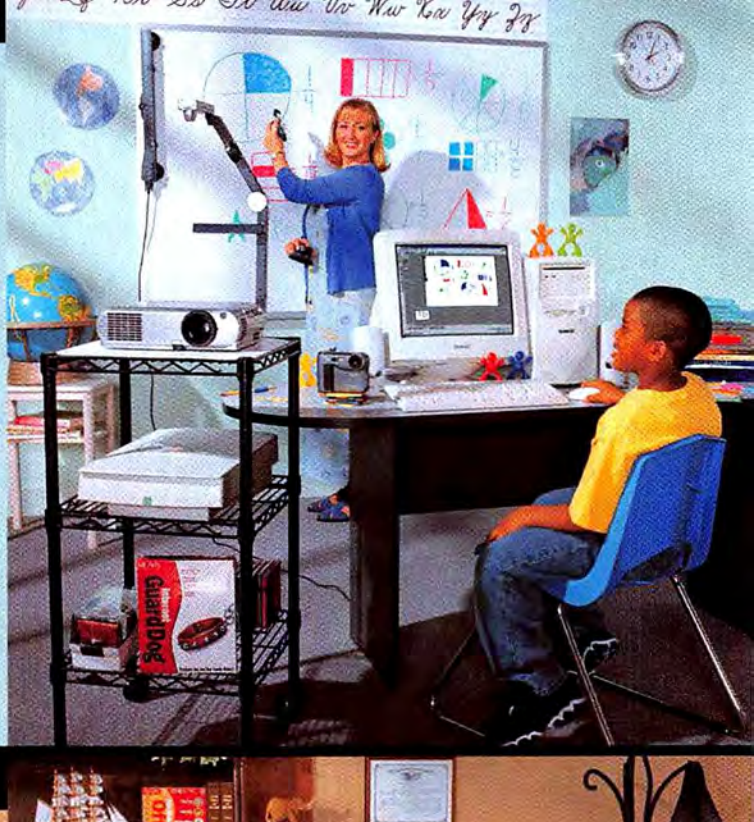

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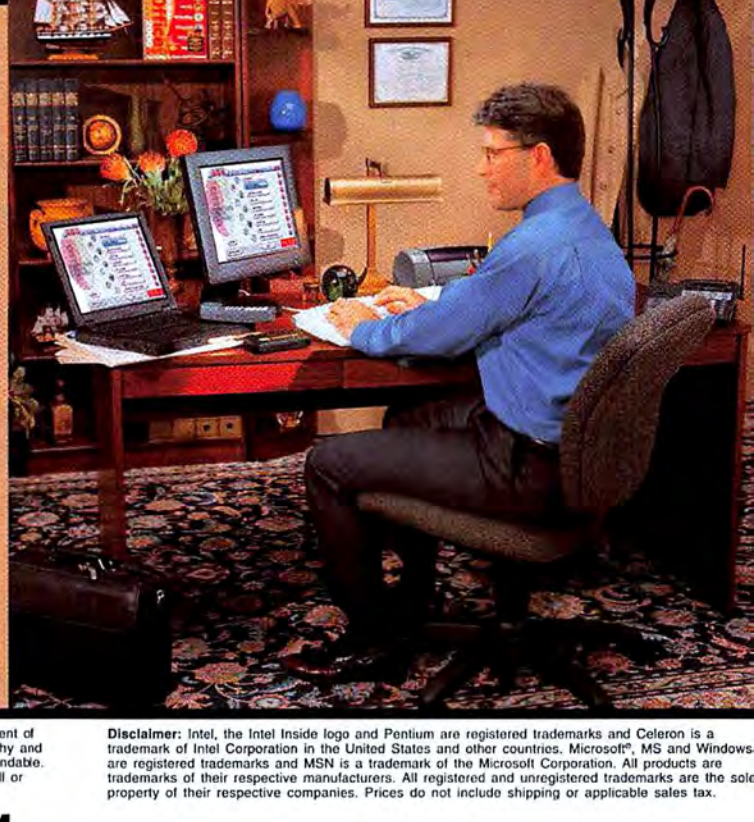

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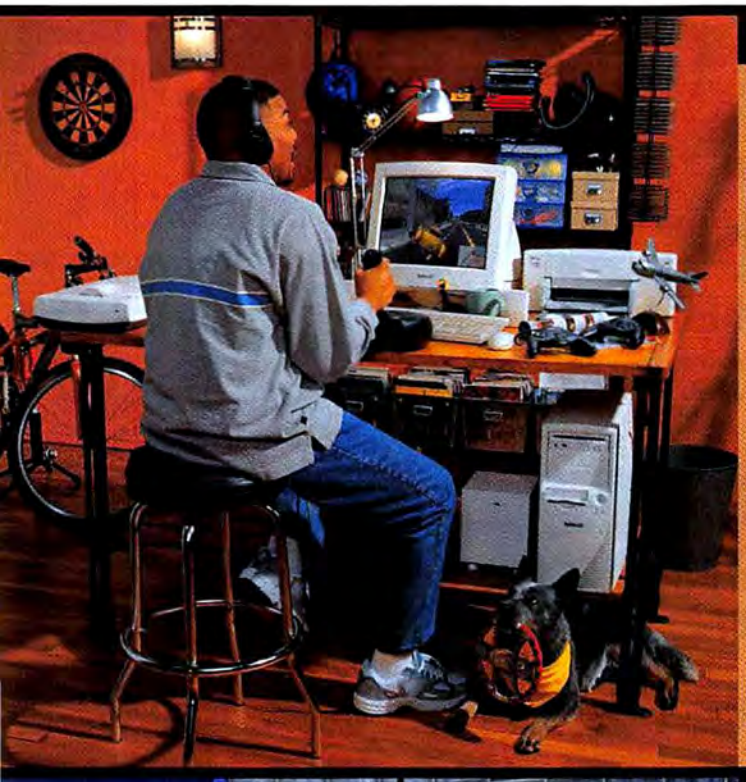

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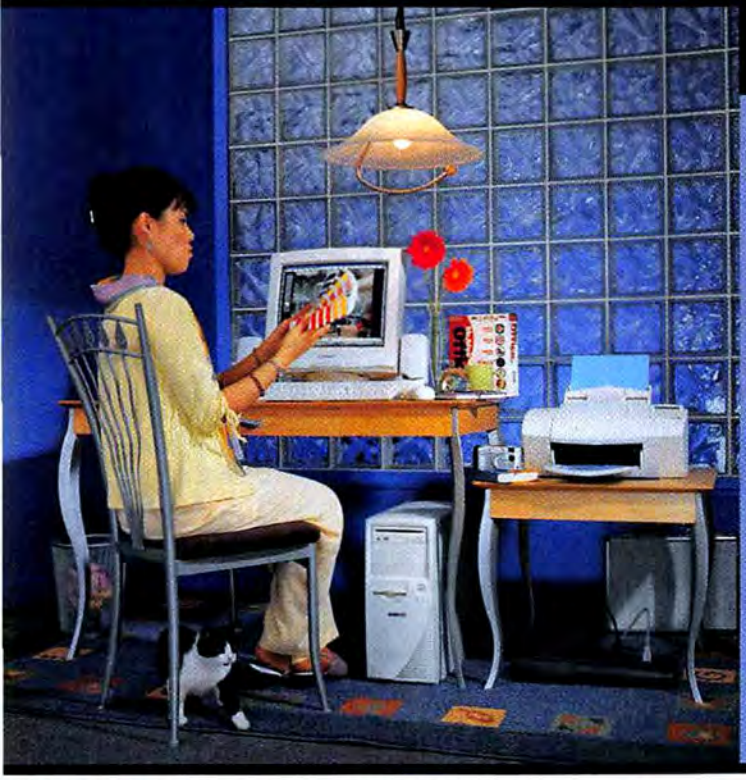

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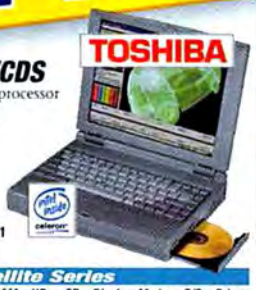

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- Windows 98

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*Choose O/S @ Bootup.

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*Choose O/S at bootup.

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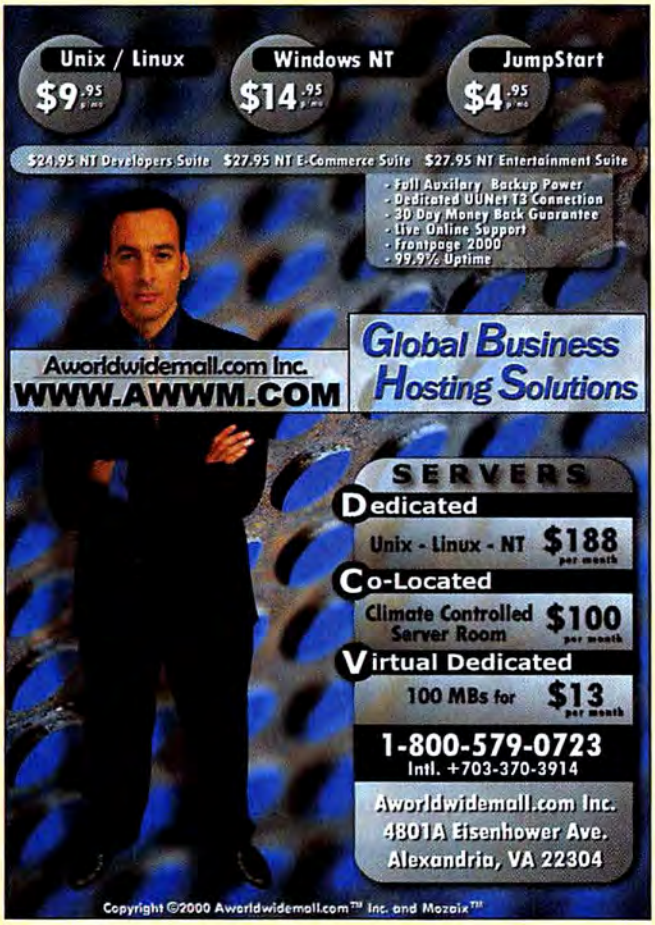

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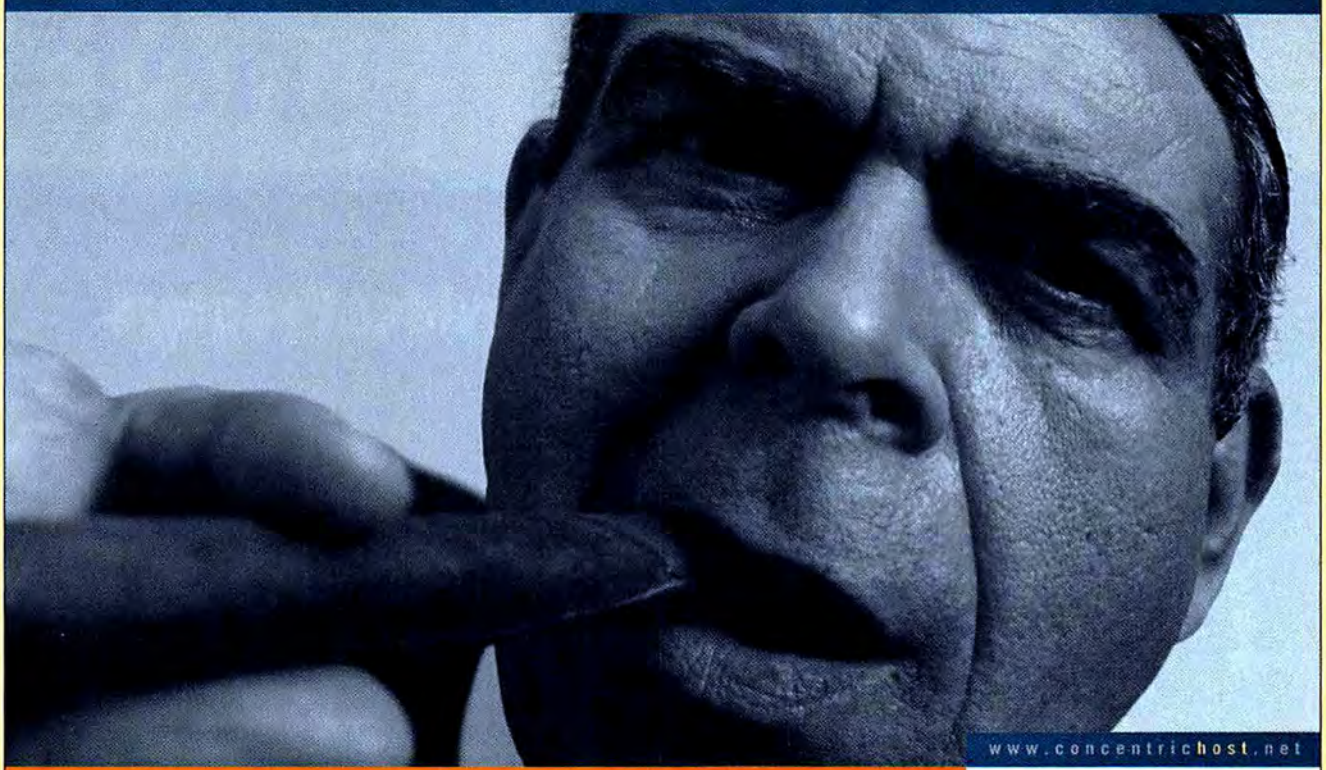

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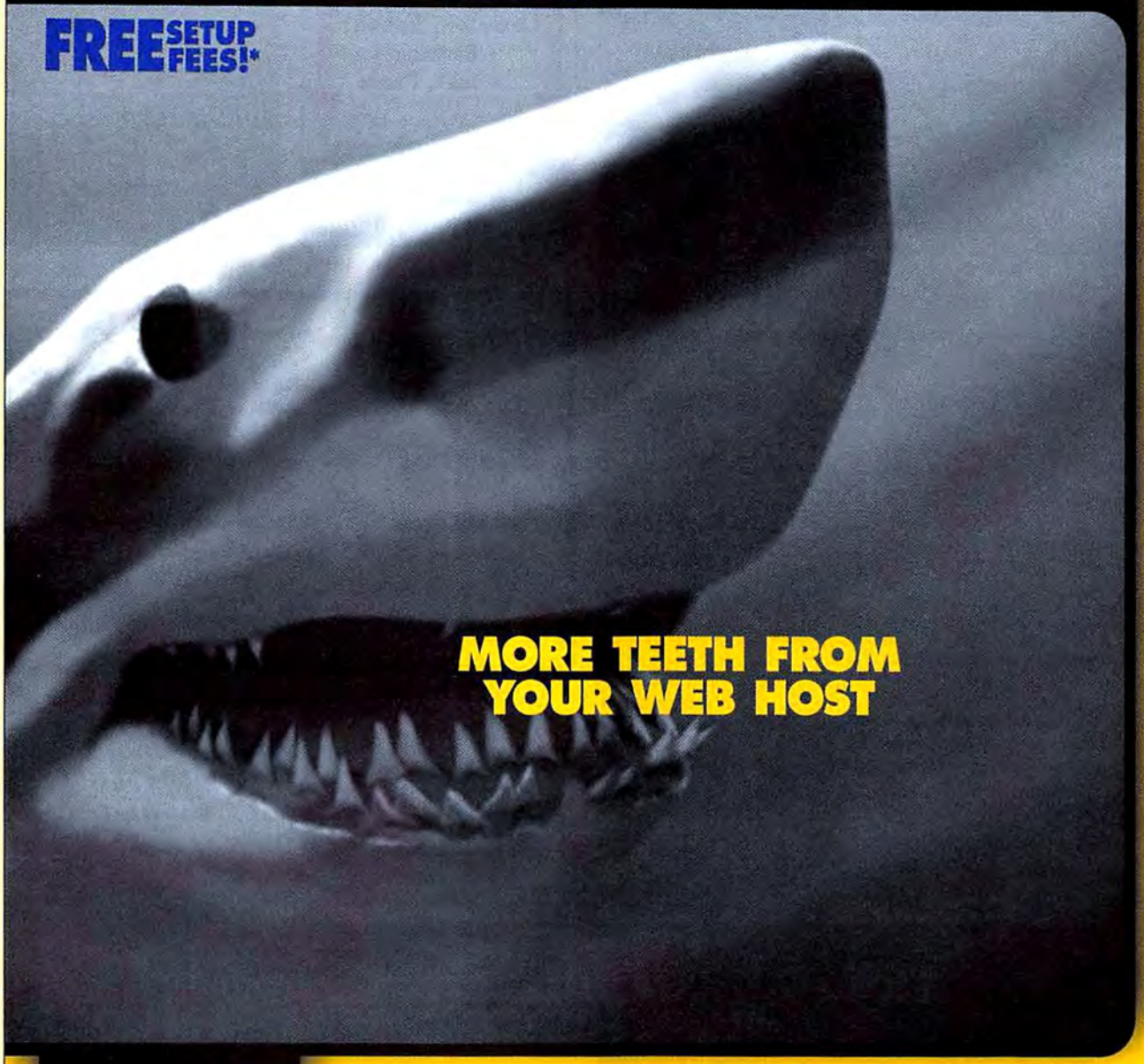

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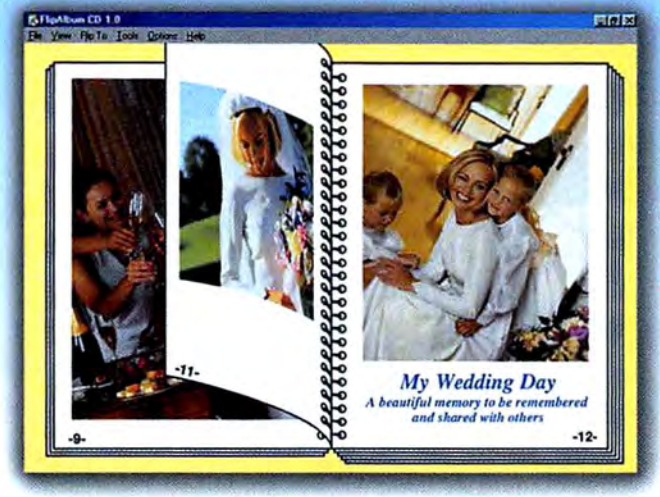

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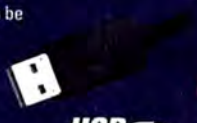

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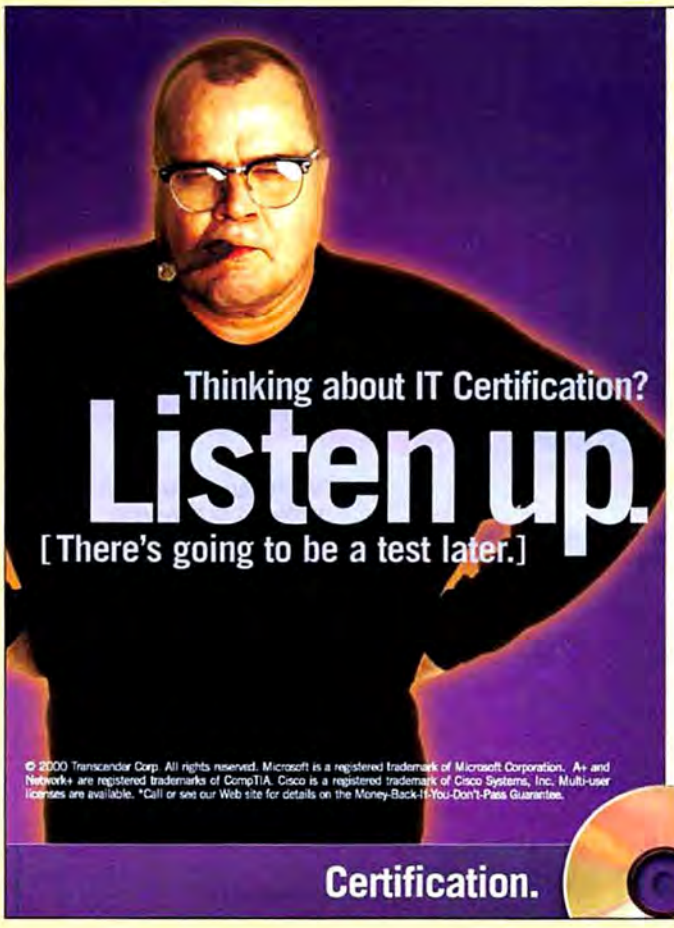

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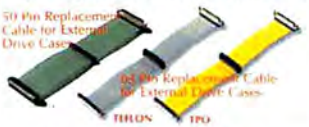

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Saluting 25 Years of Microsoft 'Innovation'

From: Billg

To: Our great innovators

Subj: A pioneering history

I'M SURE MOST OF YOU are outraged about government interference with our great business. Some of you may have heard whiny, baseless accusations that Microsoft basically takes others' ideas and moves them to new platforms, or simply buys them, and that we're not the innovative and visionary force we claim to be.

Well, just because we didn't invent the word processor or the spreadsheet or the graphical user interface or the mouse or BASIC or any of our other historic profit centers doesn't mean we're not innovative. I've decided to provide some historical perspective on our proud 25 years in business to help you see precisely what kind of company you work for.

1975: Microsoft BASIC. Sure, we borrowed the feature set and syntax from a version for a DEC machine. But we changed the default prompt from READY to OK.

1980: Xenix. Many of you may not realize this port of AT&T Unix was our company's very first operating system. True, Xenix was expensive, didn't run all that great, and wasn't open-source, but otherwise, it was everything Linux could be if only that Finnish guy weren't so doggone altruistic.

1981: MS-DOS. Sure, we bought this knockoff of CP/M. But to copy a file, DOS used the word "copy" instead of "pip." We recognize innovation when we see it!

1985: Windows. Some of you may think it resembles the Macintosh OS. Nothing could be further from the truth. True, we did sign a contract with Apple admitting Windows was one of our "derivative works of the visual displays generated by Apple's Lisa and Macintosh." Yes, one of our chief Mac programmers did much of the early Windows development. But don't forget we also hired guys from Xerox PARC, which developed the first GUIs.

1987: PowerPoint. We bought the company that invented it. That's innovative, right? Who else did that?

How many groundbreaking products have emerged from Redmond? Here's a little history.

1987: Excel 2.0 for Windows. This was the first Windows version, but we're not hung up with mundane details. This product was so innovative that we had to pair it with a special version of Windows to make it work—at a time when we were telling other developers that our systems guys and apps guys were totally separate!

1989: Word for Windows. Sure, we touted it for years before it shipped—an innovation in product scheduling! And how could anybody say it derived from Xerox's Bravo, just because that was designed by the guy who was our chief software architect before I swiped the title?

1995: Microsoft Bob. What can I say but "one of a kind"? Nothing like Bob was ever seen before—or since!

1995: MSN. Innovation isn't about being first or being best. Innovation is about extending the Windows interface to everything!

1997: Office 97. We introduce the Office Assistants, those cute cartoon characters derived directly from Bob. Wow!

1997: Hotmail. Yeah, we bought this one, too. You got a problem with that?

1998: Windows 98. Thanks to Windows Scripting Host, Outlook lets viruses send themselves to your entire address book. Can any other program (besides Outlook Express) do that?

1999: Office 2000. Its menus are supposed to adjust to the way you work. Kind of irritating, if you ask me, but the guy who sold me on it insists several people actually like the feature. When that kind of innovation comes calling, I'm big enough to answer the doorbell!

1999: Microsoft TaxSaver. We introduce a TurboTax knockoff so innovative it refuses to compute state income taxes. Whatever's good enough for income-tax-free Washington State is good enough for us!

Our vision is far from complete. Big challenges lie ahead. We must come up with great new slogans as MSN innovates the most popular features of AOL, Yahoo, and RealNetworks. We'll move forward as Windows innovates our concept of quality to everything from phones to cars and we innovate neutral terms for "crash." And all the while, you can be sure I'll credit your kind of innovation—and mine—as the source of our success.

PC World *Contributing Editor Stephen Manes is a cohost of* Digital Duo, *a series appearing on public television stations nationwide. For program information, see www.digitalduo.com.* ■

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Affordable Desktop

- Intel® Celeron™ Processor at 500MHz
- 32MB SDRAM (up to 512MB)
- 7.5GB[3] Ultra ATA HD (up to 20GB[3])
- 15" (13.8" vis) E550 Monitor
- Intel® 3D® AGP Graphics; 48X Max CD-ROM
- SB 64V Integrated Sound
- Intel® 10/100 Ethernet Controller
- MS® Windows® 98 & MS® Works Suite 2000 and Norton® AntiVirus™ 2000
- 3-Yr Ltd. Warranty[2]; 1-Yr NBD On-site Service[4]

$699 E-VALUE CODE 03773-590706

BUSINESS LEASE: $23/MO., 36 MOS.[11]

DELL™ DIMENSION™ L667

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- 32MB SDRAM (up to 512MB)
- 7.5GB[3] Ultra ATA HD (up to 20GB[3])
- 15" (13.8" vis) E550 Monitor
- Intel® 3D® AGP Graphics; 48X Max CD-ROM
- SB 64V Integrated Sound
- Intel® 10/100 Ethernet Controller
- MS® Windows® 98 & MS® Works Suite 2000 and Norton® AntiVirus™ 2000
- 3-Yr Ltd. Warranty[2]; 1-Yr NBD On-site Service[4]

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- 10GB[3] SMART II Ultra ATA HD (up to 30GB[3])
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- Intel® 3D® AGP Graphics; 48X Max CD-ROM
- Integrated AC97 Audio; harman/kardon Speakers
- Integrated 3Com® 10/100 NIC
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BUSINESS LEASE: $45/MO., 36 MOS.[11]

DELL™ BUSINESS NOTEBOOKS:

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Design and Affordability Notebook

- Intel® Celeron™ Processor at 500MHz
- 12.1" SVGA Active Matrix Display
- 32MB SDRAM; 4.8GB[3] Ultra ATA HD
- Modular 24X Max Variable CD-ROM
- 2X AGP 8MB ATI RAGE Mobility™-P 3D® Video
- NEW Microsoft® Works Suite 2000
- Microsoft® Windows® 98, Second Edition
- 1-Yr NBD On-site Service[4]

$1399 E-VALUE CODE 03773-890713

BUSINESS LEASE: $47/MO., 36 MOS.[11]

- 3-Yr NBD On-site Service[4], add $149

DELL™ INSPIRON™ 5000

Performance and Mobility Notebook

- Intel® Celeron™ Processor at 500MHz
- 15" XGA Active Matrix Display
- 32MB SDRAM; 6.0GB[3] Ultra ATA HD
- Modular 24X Max Variable CD-ROM/Floppy Drive
- 2X AGP 4MB ATI RAGE Mobility™-P 3D® Video
- 52WHr Lithium Ion Battery
- Microsoft® Office 2000 Small Business
- Microsoft® Windows® 98, Second Edition
- 3-Yr NBD On-site Service[4]

$1979 E-VALUE CODE 03773-890719

BUSINESS LEASE: $66/MO., 36 MOS.[11]

- Upgrade to CompleteCare™ Service[15], add $169

DELL™ LATITUDE™ CPt

Network-Optimized Notebook

- Intel® Celeron™ Processor at 500MHz
- 12.1" SVGA Active Matrix Display
- 32MB SDRAM; 4.8GB[3] Ultra ATA HD
- Modular 24X Max CD-ROM/Floppy Drive
- Microsoft® Windows® 98, Second Edition
- Li-Ion Battery w/ExpressCharge™ Technology
- Dual Pointing – Touchpad and Pointing Stick
- Internal 56K Capable[6] SoftModem
- 1-Yr NBD On-site Service[4]

$1499 E-VALUE CODE 03773-790714

BUSINESS LEASE: $52/MO., 36 MOS.[11]

- Upgrade to 14.1" Active Matrix Display, add $250

DELL™ SERVERS AND WORKSTATIONS:

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Affordable Entry Level Server

- Intel® Pentium® III Processor at 600MHz (up to 800MHz)
- Dual Processor/RAID Capable
- 64MB 100MHz ECC SDRAM (up to 1GB)
- 9GB[3] 7200 RPM Ultra-2/LVD SCSI HD (up to 36GB[3])
- 108GB Internal Storage Capacity
- NIC & Integrated SCSI Controllers; 40X Max CD-ROM
- Dell™ OpenManage™ Server Management Solutions
- 3-Yr NBD On-site Service[4]; 7x24 Phone Support

$1599 E-VALUE CODE 03773-290715

BUSINESS LEASE: $56/MO., 36 MOS.[11]

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- Second Intel® Pentium® III Processor at 600MHz, add $449

DELL™ POWEREDGE™ 2400

Workgroup Server

- Intel® Pentium® III Processor at 667MHz (up to 866MHz)
- Dual Processor Capable
- 64MB 133MHz ECC SDRAM (up to 2GB)
- 9GB[3] 7200 RPM Ultra-2/LVD SCSI HD (up to 36GB[3])
- Up to 288GB Hot-swappable Internal Storage Capacity
- Integrated NIC/SCSI Controllers; 40X Max CD-ROM
- Dell™ OpenManage™ Server Management Solutions
- 3-Yr NBD On-site Service[4]; 7x24 Phone Support

$2499 E-VALUE CODE 03773-290724

BUSINESS LEASE: $87/MO., 36 MOS.[11]

- Single-channel RAID with 64MB Cache, add $299
- Red Hat® Linux™ 6.2, add $149

DELL™ PRECISION™ 420

Advanced Performance Workstation

- Intel® Pentium® III Processor at 667MHz (up to 933MHz)
- Dual Processor/RAID Capable
- 128MB RDRAM (up to 1GB)
- 40GB[3] 7200 RPM EIDE HD (up to 36GB[3] 10K U160/M SCSI)
- 17" (16.0" vis) P780 FD Trinitron® Monitor
- 32MB 4X AGP Synergy Force Graphics Card
- Integrated NIC & Sound; 48X Max CD-ROM
- NEW Microsoft® Windows® 2000 Professional
- 3-Yr NBD On-site Service[4]
- 7x24 Dedicated Workstation Phone Tech Support

$2679 E-VALUE CODE 03773-490726a

BUSINESS LEASE: $94/MO., 36 MOS.[11]

DELL™ HOME DESKTOPS:

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Affordable Desktop Solution

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- 64MB SDRAM
- 7.5GB[5] Ultra ATA Hard Drive
- 15" (13.8" vis) E550 Monitor
- Intel® 3D® AGP Graphics
- 48X Max CD-ROM Drive
- SoundBlaster 64V PCI LC Sound Card
- PC Speakers
- V.90 56K Capable[6] PCI DataFax Modem for Windows®
- MS® Works Suite 2000 ■ MS® Windows® 98, SE
- 3-Yr Limited Warranty[2] ■ 1-Yr At-Home Service[4]

$899 E•VALUE CODE 03773-500708

As low as $25/Mo., for 48 Mos.[11]

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- 48X Max CD-ROM Drive
- SB Live! Value Digital Sound Card
- Altec Lansing® ACS-340™ Speakers with Subwoofer
- V.90 56K Capable[6] PCI Telephony Modem for Windows®
- MS® Works Suite 2000 ■ MS® Windows® 98, SE
- 3-Yr Limited Warranty[2] ■ 1-Yr At-Home Service[4]

$1499 E•VALUE CODE 03773-500714

As low as $41/Mo., for 48 Mos.[11]

DELL™ DIMENSION™ XPS B Series

Cutting-Edge Technology

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- 30GB[5] Ultra ATA Hard Drive
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- 32MB NVIDIA GeForce 4X AGP Graphics Card
- 12X Max DVD-ROM Drive
- SB Live! Value Digital Sound Card
- Harman Kardon HK-595 Surround Sound Speakers with Subwoofer
- V.90 56K Capable[6] PCI Telephony Modem for Windows®
- MS® Works Suite 2000 ■ MS® Windows® 98, SE
- 3-Yr Limited Warranty[2] ■ 1-Yr At-Home Service[4]

$2399 E•VALUE CODE 03773-500723

As low as $66/Mo., for 48 Mos.[11]

DELL™ HOME NOTEBOOKS:

DELL™ INSPIRON™ 3800

Design and Affordability

- Intel® Celeron™ Processor at 500MHz
- 14.1" XGA TFT Display
- 32MB 100MHz SDRAM
- 4.8GB[5] Ultra ATA Hard Drive
- Modular 24X Max CD-ROM
- 2X AGP 8MB ATI RAGE Mobility™-M1 3D® Video
- 53WHr Lithium Ion Battery with ExpressCharge™ Technology
- MS® Works Suite 2000 ■ MS® Windows® 98, SE
- 1-Yr Limited Warranty[2]
- 1-Yr Next-Business-Day On-site Service[4]

$1649 E•VALUE CODE 03773-800716a

As low as $45/Mo., for 48 Mos.[11]

DELL™ INSPIRON™ 5000

Performance and Mobility

- Intel® Pentium® III Processor at 600MHz Featuring Intel® SpeedStep™ Technology[24]
- 15" XGA Active Matrix Display
- 64MB 100MHz SDRAM
- 6.0GB[5] Ultra ATA Hard Drive
- Modular 32X Max CD-ROM
- 2X AGP 8MB ATI RAGE Mobility™-P 3D® Video
- 52WHr Lithium Ion Battery
- Internal V.90 56K Capable[6] FaxModem
- MS® Works Suite 2000 ■ MS® Windows® 98, SE
- 3-Yr Limited Warranty[2]
- 3-Yr Next-Business-Day On-site Service[4]

$2179 E•VALUE CODE 03773-800721a

As low as $60/Mo., for 48 Mos.[11]

DELL™ INSPIRON™ 7500

Mobile Desktop

- Intel® Pentium® III Processor at 600MHz Featuring Intel® SpeedStep™ Technology[24]
- 15.4" Super XGA TFT Display
- 96MB 100MHz SDRAM
- 12GB[5] Ultra ATA Hard Drive
- Removable Combo 24X Max CD-ROM with Floppy Drive
- 2X AGP 8MB ATI RAGE Mobility™-P 3D® Video
- 79WHr Lithium Ion Battery
- Internal V.90 56K Capable[6] FaxModem
- MS® Works Suite 2000 ■ MS® Windows® 98, SE
- 3-Yr Limited Warranty[2]
- 3-Yr Next-Business-Day On-site Service[4]

$2699 E•VALUE CODE 03773-800726a

As low as $74/Mo., for 48 Mos.[11]

intel inside
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Includes Windows 98, Second Edition — the home version of the world's favorite software.

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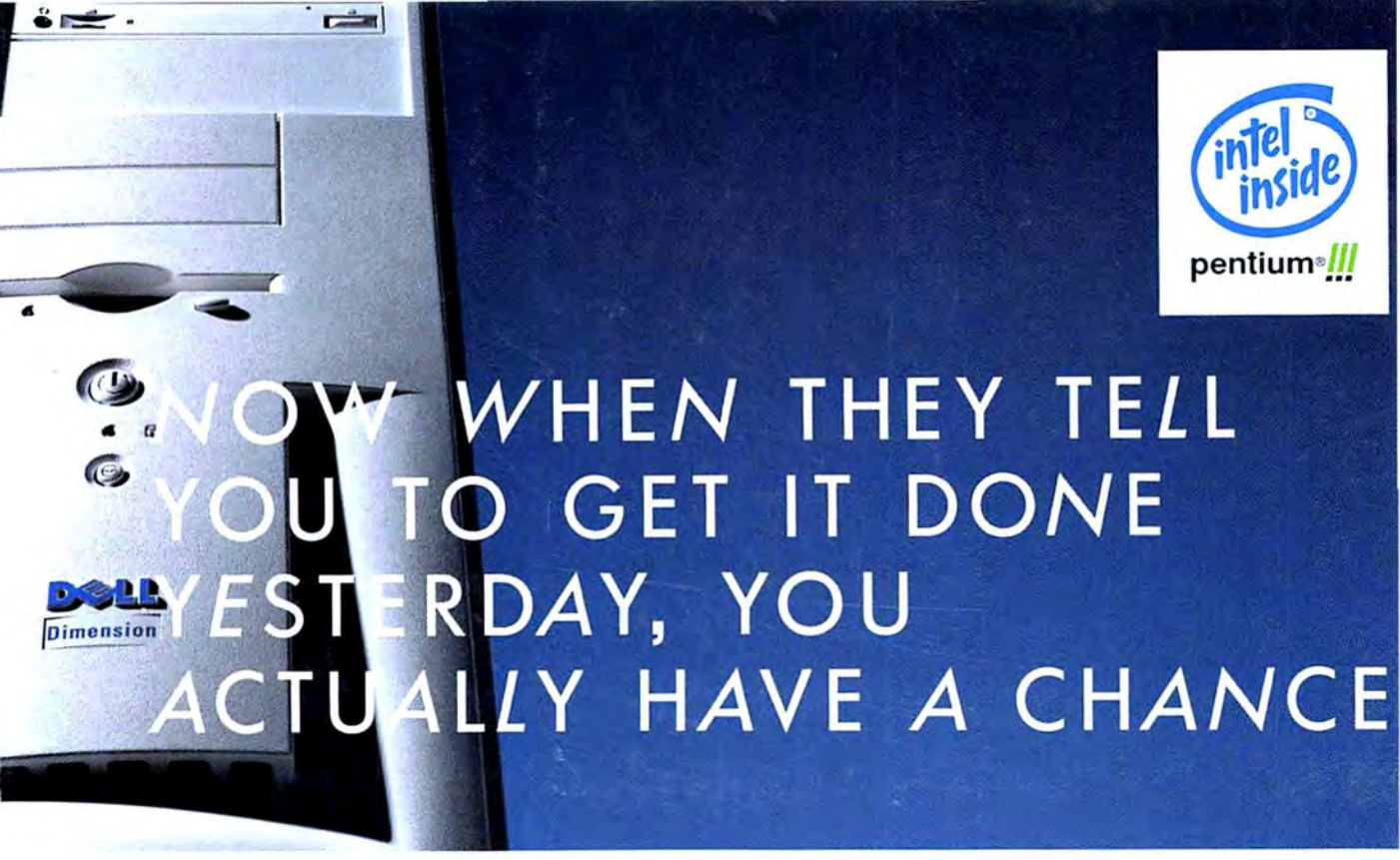

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- 16MB ATI Graphics Card; 48X Max CD-ROM
- SoundBlaster 64V Sound Card and harman/kardon Speakers
- V.90/56K[6] PCI Telephony Modem for Windows®
- MS® Windows® 98 & Office 2000 Small Business
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